APR 14 1898

THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. APRIL 14, 1898. CHICAGO, ILL. NUMBER 15

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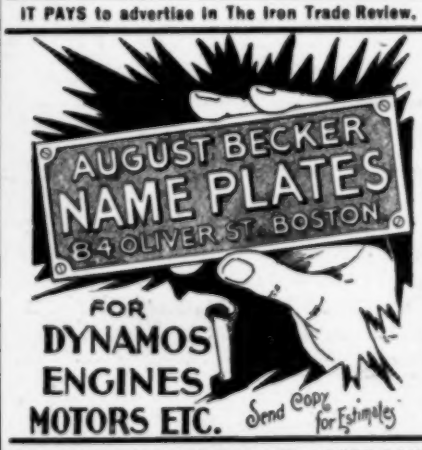

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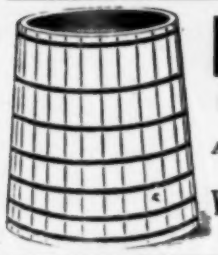

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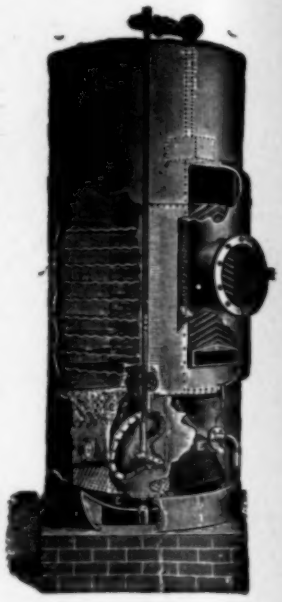

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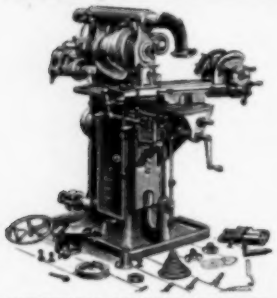

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THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. APRIL 14, 1898. CHICAGO, ILL. NUMBER 15

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

While the iron trade realizes that new buying would be more active in many lines, but for the war embargo, there is no failure to recognize the splendid pace of present production. Actual cancellations of orders are very rare; though here and there business is placed with that privilege reserved, to be exercised in case of war. On existing contracts specifications are prompt; in the case of buyers of billets, of foundry iron and notably, of malleable products, pressure for deliveries is frequent. Yet the amount of new business booked is, in many lines, plainly below the average of March, which in turn was much less than January and December. That certain mills were sold up early in the year for half of 1898 and have added steadily to their order books since, accounts for the swing of prosperity apparent in the iron industry in the midst of naturally disquieting conditions. The sale of a round lot of Central Western billets the past week for shipment west is an index of conditions in the Chicago district. Yet there is no billet famine and stationary or slightly easier prices at Central Western mills indicate that there will not be Pig iron production is still somewhat beyond requirements, and the simultaneous movement by producers of Bessemer and foundry irons to better conditions emphasizes the fact that furnaces able to maintain themselves on the present basis are practically all active, and the further fact that even those fit to survive are getting little satisfaction or profit out of the struggle. There is some curtailment in the Mahoning and Shenango valleys, two stacks having gone out, while two others are about to follow. There is no agreement in this action, however. The Bessemer furnacemen's movement has not taken shape as yet; whether it will be a selling organization buying the output of certain furnaces, or whether a corporation to lease furnaces or enter into conversion deals, has not been determined. Meantime the $10 price, valley furnace, is maintained, though some speculative iron has sold at $10.40 to $10.50, Pittsburg. Needless to say no middle interest is buying any iron at present. The producers of foundry iron will have a meeting in New York, April 22, five delegates representing each of the eight or nine districts in which such furnaces are grouped. The sole question to be considered is, How shall the surplus product be disposed of? No plan to fix prices is under consideration, the hopelessness of bringing the diversified interests together on such a basis being recognized. A tonnage tax of 5 cents is one feature proposed, and consideration will no doubt be given to measures for extending the export sale of American foundry iron even at sacrifice prices. Thus far the Alabama export trade has yielded a fair profit. The foundry iron trade, while restricted in some districts just now, is of particularly large proportions in Chicago territory; and all over the country are evidences that foundries will soon be in the market. Many new contracts would be under negotiation now, but for the war prospect, for foundry consumption everywhere is large. Plates are an active factor in the finished material market. Recent large contracts for new steel cars, for shipyard work, and for construction contracts, in addition to large consumption for locomotive and general boiler work, have filled up the mills and made prices slightly higher. Angles have been advanced $1 a ton by the structural pool. Wrought iron pipe interests at a meeting in Pittsburg, April 8, deferred final action on a price agreement to May 4, but meantime an effort is to be made to hold prices more strictly, the lowest sellers withdrawing some quotations recently made. The amount of work given out by the Government recently cuts quite a figure in current operations, and many plants are going night and day with forces larger than they have had at any time in five years. It is more and more evident that 1898 will be a year of record-breaking consumption in many lines, though, war or no war, no notable change in present prices is now considered likely.

PITTSBURG.

OFFICE OF *The Iron Trade Review and Industrial World.*
808 TRADESMEN'S BUILDING, April 13.

Finished material is again the active side of the Pittsburg market. The Chicago Postoffice—9,000 tons—,8,000 tons of shapes and plates for the 1,000 Pennsylvania R. R. steel cars, and steel for a building in Washington, D. C., place the tonnage on three contracts of the week very close to 20,000 tons. Business is heavy enough to permit an advance in angles by the pool and a temporary advance by the pipe makers. The Cuban question is known to be delaying new business but has little effect on contract orders.

PIG IRON.—No indication is found of furnaces selling below the agreed schedule—$10 at furnace, $10 65, Lorain, Cleveland and Pittsburg, and $10.10 Youngstown and New Castle. It is affirmed, however, that iron has been bought at $9.65 and $9.75 within ten days, from middle hands. The interest in the iron market for three weeks has been so slight that prices are not much of a consideration. The foundry iron dealers who advanced prices recently are adhering to the advances but are not able to sell. Gray forge is likewise quiet. Quotations in Pittsburg are as follows:

Bessemer, valley		10.00
Bessemer, Pittsburg		10.65
No. 1 Foundry	10.40 to	10.50
No. 2 Foundry	10.00 to	10.25
No. 3 Foundry	9.50 to	9.75
Gray Forge, valley	8.75 to	8.85
Gray Forge, Pittsburg		9.25

STEEL.—Billets are quoted at $15, maker's mill, Wheeling, and $15.25, Pittsburg. Sheet bars at both Wheeling and Pittsburg mills are quoted at $17 to $17.25. Rods by reason of cheaper wire nails continue lower and are selling at $22, maker's mill. An inquiry for 4,000 tons of billets for April, May and June is the only indication of new business. A number of transactions are known to be waiting for some certainty out of the Cuban crisis. The business will doubtless be placed in any event but halts as long as uncertainty continues.

PLATES.—For the 1,000 steel cars just ordered of the Schoen Pressed Steel Co., by the Pennsylvania Railroad, 8,000 tons of plates and shapes have been placed with a local mill, for delivery before June. This, with the large tonnage of ship plates being used, fills the plate mills for some time ahead. Considerable work is delayed by the Cuban situation. Mills quote: Tank, Bessemer and open-hearth, 1c to 1.05c; shell, 1.10c; flange, 1.20c; fire box, 2c and upwards.

SPELTER.—Spelter holds very firm. Quotations of $4.18 and $4.22 are made for prime Western.

IRON AND STEEL SKELP.—Skelp is quoted: Grooved steel skelp, 90c to 95c; sheared steel skelp, 1c to 1.05c; grooved iron skelp, 1.05c to 1.10c; sheared iron skelp, 1.12½c to 1.15c, four months f. o. b. buyer's mill, or 2 per cent off for cash.

PIPES AND TUBES.—Until the next meeting of pipe manufacturers on May 4 it has been agreed to hold the discount of 6 tens and 5 per cent in addition to the base discounts in force heretofore. The price, too, is shorn of freight allowances and is to be net at mill. A committee will work on the prob-

lem of deliveries and differentials and report to the May meeting. In spite of work potsponed the mills are busy on merchant pipe and on boiler tubes are running full. The base discounts still continued are: Butt weld, black, 57 per cent off; lap weld, black, 67 per cent off; butt weld, galvanized, 50 per cent off; lap weld, galvanized, 55 per cent off. Discounts on merchant boiler tubes are as follows: 2¼ inch and smaller, 72½ per cent off; 2½ inch and larger, 75 per cent off.

BARS.—Steel bars are being held at the higher prices made ten days ago. One mill is asking 1c, and 95c, half extras, is the lowest quotation for the week.

FERRO-MANGANESE.—The market for ferro-manganese is easier and 80 per cent domestic is quoted by the local producer at $48.50 and $49. Foreign has sold in large quantities at about $46, during the scarcity of domestic. Rough weather on the South Atlantic has deferred the arrival of ores now on the way, and thus caused the present scarcity in ferro. By May 1 the market is expected to become normal again.

SHEETS.—To war talk is charged the continued delay in buying sheets. The booked orders aggregate much less than those of a year ago, in the face of a much heavier consumption. Inquiries for sheets are very meager except the repeated inquiries for deliveries into next year; which the mills do not seriously consider. The few inquiries coming in are quoted on a basis of 1.95c and 2c for No. 28. Lower prices continue to be reported. Galvanized sheets are quoted at 80 and 5 and 80 and 7½ per cent off list.

STRUCTURAL MATERIAL.—New projects are probably being delayed by the uncertainty in national affairs but it has not been noticed so far that work already estimated upon is being stopped. A 2,000 ton building in Washington which it was thought would be interfered with, has been let, the material coming to Pittsburg. The general contract for the Chicago Postoffice has also been let and the 9,000 tons of shapes are expected to be awarded Pittsburg although no contract has yet been made. The present buying of shapes, however, is not believed to be the pace 1898 will eventually take. The pool has advanced the scheduled price on angles to 1.05c but otherwise is quoting as follows: Beams and channels, 3 to 15 inches, 1.15c; 18 to 24 inches, 1.25c; tees, 1.20c; and zees, 1.15c. Universal plates in connection with shapes are selling at 1c; alone, at 1.10c.

RAILS AND TRACK MATERIAL.—Rails are quoted at $18 Pittsburg. On track material we continue to quote as follows: Iron track bolts, 1.65c to 1.70c; steel spikes, 1.45c to 1.55c; splice bars, 1.10c to 1.15c; links and pins, 1.20c.

OLD MATERIAL.—A 4,000 ton sale of car wheels for St. Louis delivery is reported at $12.25, gross. Other old material has sold in Pittsburg during the week as follows: Iron rails, $13.50; steel rails, $10.50, No. 1 wrought $11.25; cast scrap, $9.50, gross; car wheels, Pittsburg, $10.25, gross; heavy melting stock, $10.75, gross; busheling scrap, $9.50, net; cast borings, $5.75; billet and bloom ends, run of mill, $11.

CLEVELAND.

OFFICE OF *The Iron Trade Review and Industrial World.*
27 VINCENT ST., April 13.

Non-Bessemer grades have predominated in the later movement of ore, and the amount now contracted for by furnacemen is much beyond any record of purchases at this point in the season. Hard and soft ores have shared in the business and the hard non-Bessemers are quite well sold. Furnacemen are in no hurry about their Mesabi purchases, and the tonnage of sales to furnaces having no Mesabi interests is small. Some interesting divergences appear in statements from different selling firms, as to the relative fineness of well known ores, determined by sieve tests. Lumpiness is not so great a desideratum, if the ore, though fine, is not of that powdery, dusty fineness that causes blowing over from the furnace stack. Some sales of Mesabi have been effected through guarantees, but there are furnacemen who are not disposed, even in this way, to help make the price on these ores just now. The rumors concerning changes in Mesabi properties are unfounded, with the possible exception of the Sellers transfer. The report that the Carnegie Co. had taken more mines on the new range doubtless grew out of its purchase of 300,000 tons of Mesabi ores other than its own.

PIG IRON.—A meeting of valley furnacemen producing foundry iron was held in Cleveland April 12, and in response to a circular five delegates were chosen to represent valley interests at a conference of foundry furnacemen to be held in New York, Friday, April 22. The disposition to be made of surplus iron is the chief problem to be considered, and the payment of 5 cents per ton of iron produced, into a common fund to be used in buying iron produced in excess of the home demand and finding a market abroad for it or keeping it from demoralizing the market at home, is part of the proposed program. In the case of the Bessemer iron producers' movement no definite step has been taken in the week. The subcommittee on incorporation and plan of organization finds diversity of opinion as to method, but one scheme talked of involves a selling company. A proposition is considered by which the new corporation, the Bessemer Furnace Co., if it should be formed, would lease furnace properties. There is no thought of any such consolidation of interests as has been talked of in newspaper articles—calling for millions of capital and the actual transfer of furnace ownership. While the development of the general business situation is awaited, to indicate the plan of action, prices are being held uniformly by producers, on the $10 valley furnace basis. A Pittsburg steel maker in the market last week for metal found furnace prices unvarying, but purchases of 8,000 to 10,000 tons of speculative iron were made at 10 to 15 cents below the furnace price. Some curtailment in valley production is being made without any concert of action. Brier Hill has gone out, after a long run. One Andrews & Hitchcock furnace has been idle since the recent explosions, and Haselton at Youngstown, and Stewart at Sharon are on the point of going out. The repairs at these plants will require weeks. Something is doing from week to week in foundry iron, and the price is a trifle firmer, ranging above $9.50 as the minimum for No. 2 at valley furnace. Foundries are very busy and some of them are hurrying their iron. Gray forge has sold at $8 85 valley furnace, or $9.10 delivered at valley mill. Lake Superior charcoal is unchanged at $11.25 to $11.50, Lake Erie port.

Bessemer, second quarter	$10 65	Valley Scotch No. 1	$10 65@10 75
No. 1 Strong Foundry	10 65	Valley Scotch No. 2	10 25@10 40
No. 2 Strong Foundry	10 15	Gray Forge	9 40
No. 3 Foundry	9 65	Lake Superior Charcoal	11 50

FINISHED MATERIAL.—Active operation of rolling mills continues, though with the exception of the old Consolidated plant, local wire and nail mills of the American Steel & Wire Co. are still shut down. The output of steel billets and of rods and wire products from the local steel plant has kept up steadily and its converting plant has made exceptional tonnage records. A local consumer of billets is in the market for a considerable tonnage. The steel for two local buildings is yet to be placed. The Rose building is to go up at once; the Home Telephone building may be delayed. Angles are $1 a ton higher by action of the structural pool and are now 1.05c, Pitttsburg. Plate business is excellent and one large producer is out of the market for any near-by deliveries. About $1 a ton advance is asked, 1.05c, Pittsburg, being minimum, while on universal plates some sellers quote 1.10c. There is a better feeling in bars, the majority of mills making 95c, Pittsburg, their minimum, this being 3½c advance per 100 lbs. over some recent transactions. In wire and nails the jobbing trade is a less active buyer than might be expected. We quote $1.15 on wire and $1.35 on wire nails. Old material is quiet, with $13.50 asked for old iron rails, $10 for old steel rails, $8.50 for cast scrap and $11 for car wheels.

CHICAGO.

OFFICE OF *The Iron Trade Review and Industrial World.*
1142 MONADNOCK BLOCK, April 13.

Some large buyers have postponed making heavy purchases of material until the Cuban situation has cleared up, and meanwhile are buying only what they need from week to week. With most consumers, however, business has been so large that they have been compelled to secure their raw materials without reference to political agitation, and it is not thought that trade has suffered seriously because of the rumors of war. Sales last week were of moderate volume, keeping up at about the rate of the previous two or three weeks. The largest contract closed was for 10,000 tons of billets, from a middleman to the Washburn-Moen Co., for its Waukegan plant. Structural material continues to be in good demand, in small lots, and there are several propositions open for large tonnage which may be closed soon. The

Postoffice contract has been awarded and the steel comes from Pittsburg. Car work continues to take a considerable quantity of material, and contracts for cars and the necessary material to build them are being placed every week.

PIG IRON.—Sales of Southern iron amounting to a very large tonnage were made last week. At least one contract of 5,000 tons was placed, and it is reported that two of this size, or larger, were given out. In view of the belief held by many in the trade that war with Spain would be hurtful to the iron trade, and would result in lower prices, the confidence of some of the largest buyers is reassuring. Representatives of some of the buying interests have expressed the opinion that in the event of war prices will go higher, and that the situation may take on many of the phases of a boom. As a matter of fact, sales of iron, in this territory at least, since the first of the year have been much larger than ever before for a like period. The furnaces in and near Chicago are all running full, and are sold up for months ahead, some of them for the balance of the year. The Southern furnaces have iron to sell, but notwithstanding the fact that two companies are selling considerably under the quotations set by the furnaces in the association, one of the sales agents of association furnaces reports large sales of their iron at full prices. The local furnaces are asking from 50 cents to $1 a ton over Southern prices, and are having no difficulty in selling at these figures what little iron they make that is uncovered by contract. The chief factor in keeping prices down to the present level is the fear entertained by many, contrary to the view noted above, that a war would cause a falling off in demand for finished products. Quotations are as follows:

Lake Sup. Charcoal	$11 00@11 50	South'n Coke No. 3	$10 10@10 35
Local Coke Fdy. No. 1	11 50@12 00	Southern No. 1 Soft	10 60@10 85
Local Coke Fdy. No. 2	11 00@11 50	Southern No. 2 Soft	10 35@10 60
Local Coke Fdy. No. 3	10 75@11 00	South'n Silveries	11 25@11 50
Local Scotch Fdy. No. 1	11 50@12 00	Jackson Co. Silveries	12 50@14 50
Local Scotch Fdy. No. 2	11 00@11 50	Ohio Strong Softeners	12 00@12 25
Local Scotch Fdy. No. 3	10 75@11 00	Alabama Car Wheel	14 00@16 00
South'n Coke No. 1	10 60@10 85	Malleable Bessemer	10 75@11 00
South'n Coke No. 2	10 35@10 60	Coke Bessemer	11 50@12 00

BARS.—Business has been good, most of it in small lots, but the aggregate tonnage is fully up to the expectations of the mills. The agricultural implement manufacturers have not actually come into the market as yet for their season's requirements, but some of them have begun to look into the situation a little, and it is thought they will negotiate definitely somewhat earlier than usual this year. Car works have taken considerable material in the week, and will buy further soon, to cover car contracts given out lately, and for other car business under negotiation. The market is decidedly firmer than it has been of late, and while higher prices are made by only a few mills, quite a number of orders have been taken recently at quotations above those we give as the minimum. The mills are not anxious to take much business for delivery beyond the middle of the year at prevailing prices, believing that iron and steel will be worth more money within a few weeks. Common iron is quoted at 1.05c to 1.10c; guaranteed, 1.10c to 1.15c; soft steel bars, 1.15c to 1.20c.

CAR ORDERS.—It is reported that two orders for cars were given out last week, but full information regarding them could not be secured. Considerable business has been done in small lots, and the material men have had a good week.

RAILS AND TRACK SUPPLIES.—A few small sales of heavy section rails were made. Light sections continue in good demand, and the sales of the week included several for considerable tonnage. Quotations are as follows: Rails, $20 to $22.50, according to specifications; steel splice bars, 1.15c to 1.25c; track bolts, with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.50c to 1.60c.

BILLETS AND RODS.—The only important transaction of the week was a sale of 10,000 tons made for Waukegan delivery, by Central Western interests. This, it is understood, went at a figure quite a little under $17, Chicago. Other business was light, and was only in small lots. The local mills report no sales. Quotations are made at $17, for billets, and $23.75 for rods.

STRUCTURAL MATERIAL.—The Postoffice contract is understood to have been given to John Pierce, of New York, and the material, in that case, is to be rolled by the Carnegie Steel Co. The Drainage Canal Commission will open bids May 18 for several bridges, taking altogether about 2,500 tons of material. Other business was good, but in comparatively small lots. Prices are firmer, and those on angles and plates have been advanced somewhat. Quotations are made as follows: Beams, 15-inch and under 1.30c to 1.35c; 18, 20 and 24-inch, 1.40c to 1.45c; angles, 1.20c to 1.25c; plates, 1.15c to 1.20c; tees, 1.35c to 1.40c. Small lots from stock are quoted at one-quarter to one-half cent higher.

PLATES.—Considerable figuring is being done on some large plate orders which are expected to be placed soon—4,000 or 5,000 tons, or more. This includes orders for ship plates, tank plates, and plates for pipe work. Business last week was not large, yet included one or two good sized contracts. Prices are firmer, and are made as follows: Tank steel, 1.15c to 1.20c; flange steel, 1.20c to 1.40c; fire box steel, 1.85c to 5c.

MERCHANT STEEL.—Business in the week was very good, and a few quite large contracts were placed. The demand appears to be increasing, if anything. Prices follow: Open-hearth spring, tire and machinery steel, 1.60c to 1.70c; smooth-finished machinery steel, 1.60c to 1.65c; smooth finished tire, 1.50c to 1.60c; tool steel, 5.50c to 7.50c; specials, 11c and upwards.

SHEETS.—Demand is keeping up well and indicates a continuance of good business. Quotations are made at 2.05c to 2.15c for No. 27 black, and 80 and 7½ to 80 and 10 per cent discount for galvanized.

SCRAP.—The market has been quiet, with only small sales of any class of scrap. Dealers are not looking for much business right away. Their selling prices are as follows:

Old iron rails, gross	$12 00@$12 25	Axles, net	$14 25@$14 75
Old steel rails, long, gr.	10 50@11 00	Cast borings, net	4 00@4 25
Old steel rails, short	9 00@9 25	Wrought turnings, net	5 50@6 00
Old wheels, gross	11 00@11 50	Axle turnings, net	6 25@6 75
Railroad forge, net	12 00@12 50	Mixed steel, gross	7 25@7 50
Dealer's forge, net	10 50@11 00	Stove plates, net	6 00@6 25
No. 1 mill, net	7 50@8 00	Heavy melting steel, gr.	8 25@8 50
Heavy cast, net	8 50@9 00	Old iron splice b., net.	13 25@13 50
Malleable cast, net	8 00@8 50		

PHILADELPHIA.

April 12.

There is quite a falling off in the amount of new business coming in, and prices are therefore tending to a somewhat lower range. Quotations are nominally unchanged, but there is a great deal of irregularity, some showing a willingness to make concessions, others firm at their asking prices, according to condition of their order books, or because of other circumstances. Buyers are not particularly gratified at these changes, but as they have to meet competition with other consumers, they work hard to secure the best terms, as well as the lowest prices possible. The output is probably at the highest limits ever reached, but order books are not as full as they were some time ago, and it is this feature that is causing uneasiness. A very large business during the remainder of the year may be regarded as an absolute certainty, but so much productive capacity is in operation that even a very slight falling off in the demand might involve serious results. Spanish-American complications are doubtless responsible for the existing slackness in new demand. Export trade keeps up well, however, and pig iron, steel bars and wrought pipe have figured largely in the recent outward movement, with indications of further increase. There is at the moment considerable pressure to sell pig iron and some irregularity in prices. In general $10.75 for No. 2X and $10.50 for No. 2 plain is the basis, though on a few orders recently there has been a shading of this. The range of Philadelphia quoted prices is as follows, with the usual freight deduction on deliveries at near-by points in the direction of Eastern Pennsylvania and Virginia furnaces: No. 1X foundry, $11.50 to $12; No. 2X, $10.75 to $11; No. 2 plain, $10.40 to $10.50; ordinary mill irons $9.75 to $10.25; basic, $10; Bessemer, $12 to $12.25. The demand for steel is light, and $17.25 is about the market. In finished material plate and sheet mills are having a satisfactory run of new orders, but shape and bar mills are not faring so well in the way of new business. Structural plants, however, have quite a little work still in hand. Shipyard work has been quite encouraging. We quote refined bars at 1.12½c to 1.15c; common bars, 1.05c to 1.10c; plates, 1.15c to 1.20c; angles, 1.15c to 1.20c; beams and channels, up to 15 inches, 1.30c.

THE scale convention of the Amalgamated Association of Iron and Steel Workers which meets in Cincinnati, May 17 will be composed of 200 delegates, and will be in session nearly two weeks.

THE IRON TRADE REVIEW

AND

INDUSTRIAL WORLD.

DEVOTED TO MACHINERY, METAL-WORKING AND FOUNDRY TRADES AND IRON AND STEEL MANUFACTURE.

PUBLISHED EVERY THURSDAY BY

THE IRON TRADE REVIEW CO.,

CLEVELAND, OHIO.

CLEVELAND, 27 VINCENT STREET.

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1142 MONADNOCK BLOCK.
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PITTSBURG:
807 TRADESMEN'S BUILDING.
JAMES R. MILLS, JR., Manager.

Subscription (strictly in advance), $3 per annum. Advertising Rates Furnished on Application.

The Cleveland News Co. will supply the trade with THE IRON TRADE REVIEW, through the regular channels of the American News Co.

ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER

APRIL 14, 1898.

WATER TRANSPORT AND CHEAP STEEL.

In a recent communication to the Pittsburg *Dispatch*, Mr. Carnegie, referring to the advantages of Pittsburg in both water and rail transport, notes the improvements on the Monongahela and Ohio rivers, and the low freights that are possible by utilizing lake and canal routes. Of the latter he says:

> We are upon the threshold of another important advantage. The Erie Canal is being deepened by nine feet. When this is done the cost of transportation between Pittsbug and New York, Boston and all northeastern points will be less than one-half present rates for the seven busy months of the year. Barges between Conneaut and New York will leave each point daily, and to transport the products from Pittsburg to Conneaut in cars which would otherwise move empty to the lakes for ore, will cost little. A canal transporter has given me 75 cents per ton by barge line from Conneaut to New York as his price upon the deepened canal. Between Conneaut, Milwaukee, Chicago and other lake ports transportation will not cost more. When these barge lines are established and the Ohio is improved, Pittsburg will be the best distributing, as it is now the best maufacturing, point in the United States.

The importance to Pittsburg and to the country of cheap water rates in the extension of iron and steel exports, is a matter that has not had due consideration in connection with the Erie canal controversy in New York. There are considerations here that argue strongly for the proposition to turn the canal over to the United States Government. But it is to be feared that partisanship rather than a broad view of ultimate benefit to New York City, New York State and the country, has ruled in the consideration of the important proposals recently under discussion at Albany. The $9,000,000 appropriation, that was expected to give a 9-ft. channel, has only carried the work to a point at which other millions—the estimated $7,000,000 may or may not be sufficient—must be used to save what already has been spent. And now that the suspicion of jobbery has been set afloat, the people of New York may be slow to approve the proposition for the additional money. The State Senate has defeated, two to one, the proposition to let the people vote on a constitutional amendment removing the prohibition of transfer to the Federal Government. The question has thus become so complicated that the chances of a forward movement, even so conservative as the carrying out of the plans for a 9-ft. channel have been seriously endangered. Important as is the improvement of the Erie Canal to the Northwest and the Central West, it is a pity that the main proposal has been side-tracked for issues, some of them impractical and others too advanced to enlist any influential support. Ultimately we believe the Erie Canal will be turned over to the Government for such development as the great traffic of the West and Northwest demands for the larger foreign conquests that are before it. But time will be required to bring the people of New York to this broad view of the future of their waterways. Meantime the city of New York will see even larger inroads upon its export trade by other Atlantic cities—and these have been steadily increasing in the past 20 years—unless the policy of improvement adopted two years ago is followed up. It would be poor policy to refuse to spend $7,000,000, when the alternative is the loss of all advantage of the $9,000,000 already spent.

Meantime, the new road from Pittsburg to Conneaut is demonstrating what could be done to enlarge the market for cheap Pittsburg steel, with better water facilities, by making a beginning in shipments of finished material. Already the shipment of 40,000 tons of steel rails to Conneaut and thence by vessel to Ft. William and Duluth, for the Canadian Pacific and Great Northern railroads, has been arranged. Machinery for the rapid loading of rails into vessels at Conneaut has been devised, and six or seven rails can now be handled as quickly as one under the old method of loading. A through rail and water route from Pittsburg to the Northwest and to New York means a speedy widening of the circle of Pittsburg territory. And what is true of the extensions of Pittsburg's market, is true to even a greater degree of steel works located on the lake shore, able to load directly into vessels. The great drawback to Eastern shipment to-day, as demonstrated in the case of the steel canal boats, now running between Lake Erie and New York, is the small cargo that can be carried with the present width and depth of the Erie Canal, the slow speeds permitted, and the serious delays encountered in unloading in New York.

MR. A. P. HEAD'S comments on American blast furnace construction and operation, from which an extract is given elsewhere, indicate that our English cousins are still skeptical as to the advantage of the high furnaces, the rapid driving, the greater blast pressure and the greater volume of air which are characteristic of advanced furnace practice in this country. Mr. Head, like Mr. Jeans, who wrote on the same subject about a year ago, lays stress on the amount of pig iron produced in England in the life of a lining, and sets the original investment in capital and the later costs of re-linings over against

the tonnage. The English idea seems to be that if an English furnace costing, say, half as much as an American furnace produces as much pig iron in 10 years as the American furnace in five years, the two propositions are nearly quits, with the advantage on the side of the English furnace because its linings last longer. This long-life, slow-life idea entirely ignores the greater machinery wear of 10 years' operations, as against five years, and the most important of all features of American methods —the economies insured at the start by investments in appliances which reduce labor cost to a point never touched in English practice. Mr. Head's intimation that the American striving after large outputs from one furnace is rather due to rivalry between furnace managers than to economy in working expenses or capitalization, is scarcely complimentary to the American business sense. But Mr. Head is in error. The high furnace with big bosh has been built to make money and to save money and while there is some margin for differences of opinion among American blast furnace engineers, as to just what height or what diameter is most efficient, the steady enlargement of the area of reduction is a characteristic of American furnace operation that has come to stay, and cost sheets give ample proof that our furnacemen are on the right track. If *a posteriori* proof were sought, the great outward movement of material from American steel works would suggest that "rivalry between furnace managers" is coming to something very substantial, in the achievement of costs never before attained on either side of the water. It is worthy of note, in this connection, that the new Lorain, O., furnaces in which English capital will be invested, and the plans for which have been passed upon by two eminent steel masters and metallurgical experts, will be of the extreme height and diameter of the new American practice.

THE general manager of one of the leading lines entering Chicago said recently that to keep the rolling stock of the railroads of the country up to the present efficiency, which is still short of caring for the business of the country, means the building of at least 60,000 freight cars a year, for the next 10 years. The *Railroad Gazette* made inquiries early in the year which showed that, based on the calculations of roads whose mileage is 60 per cent of the total there would be 38,000 freight cars built in the first half of 1898. The Chicago estimate would seem to be entirely conservative, especially in view of a total of 40,000 to 45,000 cars in years like 1896 and 1897.

A CANVASS of the foundry situation in the Chicago district shows that the demand for castings of all descriptions is so large, and has been for several weeks, that practically every foundry in that territory is occupied to its full capacity. Some users of castings, notably agricultural implement manufacturers and car builders, are unable to obtain them in anything like the quantity necessary to fill immediate requirements. This applies both to gray iron castings and malleables, but particularly to the latter. One of the largest implement makers in Chicago is employing the full capacity of no less than three foundries beside the one connected with its own works, and this latter is one of the largest of its class in the country. Such is the difficulty experienced by some agricultural works in getting deliveries on their contracts formalleable castings, that the erection of additional capacity in this line is being considered. The pressure upon malleable plants has been increased by the attitude taken by the Inter-State Commerce Commission on the requests by railroads for further time to complete the equipment of their cars with automatic couplers. The Commission has not been arbitrary, but it has given the roads to understand that it is in earnest in the enforcement of the law, and much work that has been postponed from year to year must be done this year. Charcoal iron producers have felt the impetus in the malleable business, and with their low prices—in many cases competing squarely with coke malleable Bessemer iron —have been regaining some of the ground lost in recent years to coke furnaces.

Analyses of Lake Superior Charcoal Irons.

A neat pamphlet just issued by the Superior Charcoal Iron Co. gives interesting facts concerning the "Pioneer," "Antrim" and "Elk Rapids" brands of Lake Superior charcoal irons handled by that company. The combined capacity of the Pioneer, Antrim and Elk Rapids furnaces, located respectively at Gladstone, Mancelona and Elk Rapids, Mich., is 2,500 tons a week, this product being handled through the main offices of the Superior Charcoal Iron Co. at Grand Rapids, Mich., in charge of J. C. Holt, secretary and treasurer. These irons are represented in the New England and Eastern trade by Wm. Gerhauser, of Detroit, and in the Northwest trade by Austin Farrell, of Gladstone, Mich. The analyses of the three brands according to grade are given below:

PIONEER.

GRADE.	SILICON.	CHILL.
A Scotch	2.60 to 2.90	
B Scotch	2.40 to 2.60	
C Scotch	2.10 to 2.40	
No. 1 Soft	1.90 to 2.10	
No. 1 Special	1.60 to 1.90	
No 1 Foundry	1.35 to 1.60	
No. 2 Low	1.15 to 1.35	
No. 2 High	.90 to 1.15	
No. 3 Low	.75 to .90	¼ inch
No. 3 Medium	.65 to .75	¼ inch
No. 3 High	.45 to .65	⅜ inch
No. 4 Low	.35 to .45	½ inch
No. 4 High	.25 to .35	1½ inch
No. 5	.10 to .25	Mottled
No. 6	.00 to .10	White
Phosphorus		0.15 to 0.22
Manganese		0.40 to 0.60
Sulphur		trace to 0.018

ANTRIM.

GRADE.	SILICON.	CHILL.
No. 1 A	2.60 to 2.30	
No. 1 B	1.75 to 2.00	
No. 1 C	1.50 to 1.75	
No. 2 D	1.25 to 1.50	
No. 2 Soft	1.10 to 1.25	
No. 2 Medium	.90 to 1.10	
No. 2 Hard	.75 to .90	
No. 3 Soft	.60 to .75	¼ inch
No. 3 Medium	.50 to .60	⅜ inch
No. 3 Hard	.40 to .50	¾ inch
No. 4 Soft	.30 to .40	1 inch
No. 4 Hard	.20 to .30	1½ inch
No. 5	.17 to .20	Mottled
No. 6	.14 to .17	White
Phosphorus		0.15 to 0.22
Manganese		0.30 to 0.70
Sulphur		trace to 0.018

ELK RAPIDS.

GRADE.	SILICON.
Special 1 A	2.60 to 2.80
Special 1 B	1.80 to 2.00
Special 1 C	1.60 to 1.80
No. 1 A	1.30 to 1.60
No. 1 B	1.40 to 1.50
No. 1 C	1.50 to 1.60
No 2 A	.70 to 1.00
No 2 B	.90 to 1.05
No 2 C	1.05 to 1.30
No. 3 A	.50 to .70
No. 3 B	.60 to .80
No. 4 A	.30 to .40
No. 4 B	.40 to .50
No. 5	Under .30
No. 6	White Iron
Phosphorus	0.15 to 0.22
Manganese	0.10 to 0.70
Sulphur	trace to 0.018

Tests are made day by day of these irons and the adaptations of special grades to special lines of work, and in general to malleable and car wheel work are made a matter of particular study.

VERTICAL BLOWING ENGINE.

A modern design of cross compound vertical blowing engine, built by the Rarig Engineering Co., of Columbus, is illustrated in the three accompanying cuts. It has a high pressure cylinder of 42 inches diameter and a low pressure cylinder 78 inch by 60 inch stroke, and is fitted with Corliss valve release gear. The governor is constructed to vary the speeds of the engine as may be desired. The blast cylinders, 88 inches diameter by 60 inches stroke, are suspended to the under side of the bed plate and fitted with the Kennedy piston valve; one important feature of this construction is that the height of the engine above the foundation is reduced over one-half. The engine can be constructed to operate either single or double.

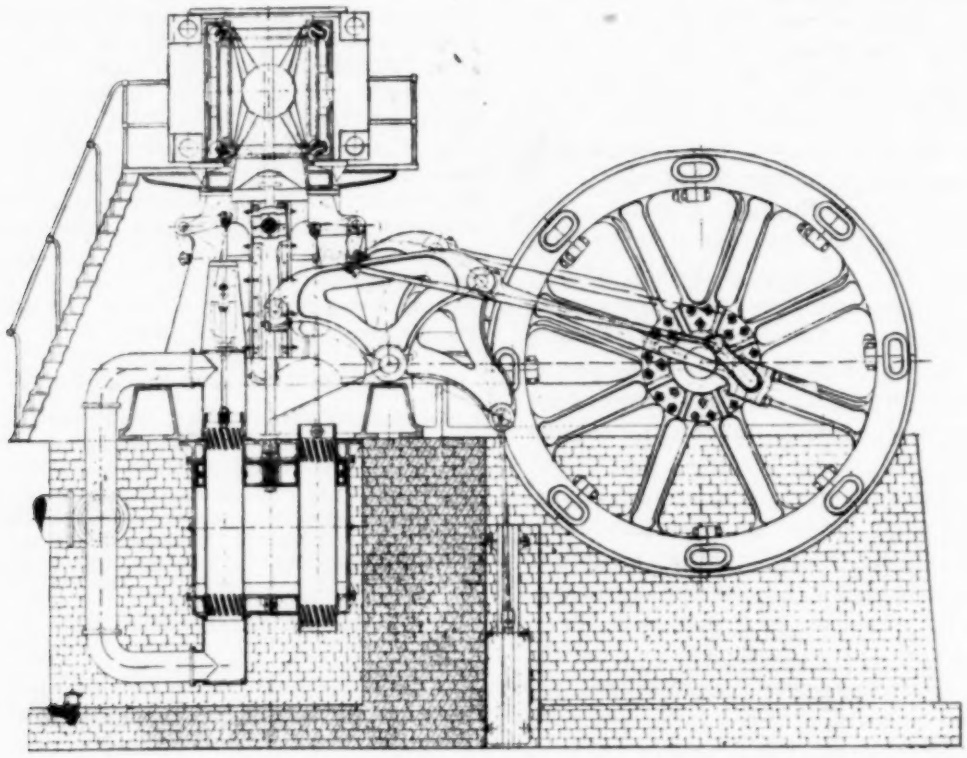


FIG. 1.—ELEVATION OF CROSS COMPOUND VERTICAL BLOWING ENGINE.

The cylinders are made of special close iron and covered with steel jacket, and the air space filled with mineral wool. The steam passage to the cylinder is double-ported the full area of the steam pipe.

The air cylinders, 88 inches diameter by 60 inch stroke, are made of close-grained iron, flanged to correspond with the heads. Each cylinder is supported on four heavy box-shaped columns and flanged solidly on the bed plate. The tops of the columns receive the heads on which the cylinders rest. The guides are secured to the columns and laterally braced.

The frames are of the box pattern, ribbed internally and have extra wide foundation surface. The portion on which the columns rest is made in two sections, one for each engine, joined together in the center between the cylinders, and having the rocker shaft box cast on top solid to the bed casting. The lower part is faced true to receive air cylinder head and top faced for column seats. The fly-wheel portion of the bed is cast in one piece, with two journal boxes to receive the main shaft. The connecting ends are fitted to the main bed plate and securely bolted and doweled thereto. The bearings for the fly-wheel shaft and rocker shaft are fitted with quarter boxes and adjustable wedges.

The main journals for the fly-wheel shaft are of modern design. The lower portions are bored true and fitted with circular box so that they can be removed without taking out the shaft. The rocker beam journals are large and are fitted with quarter boxes and adjustable wedges.

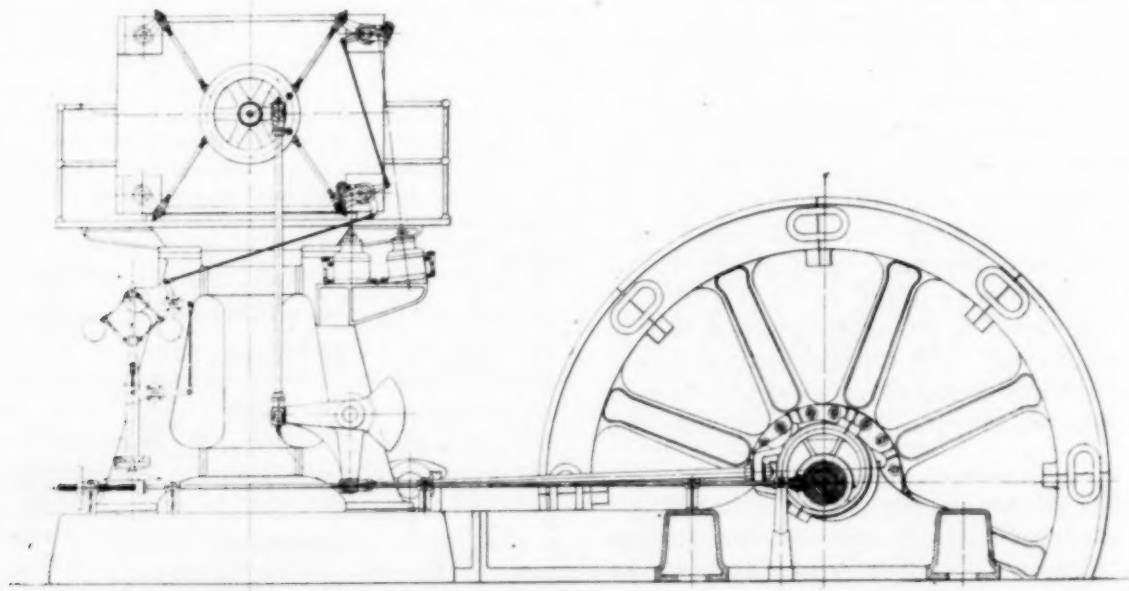


FIG. 2.—CROSS COMPOUND VERTICAL BLOWING ENGINE IN SECTION.

There are two fly-wheels, each weighing 80,000 lbs., and 20 ft. in diameter. They are made in eight sections, planed and fitted to male and female hub by reamed holes and turned bolts. The rims are linked on each side of the joint and

bolted on the inside. The hubs form the crank to receive the wrist pin. The connecting rods are made of forged steel and are fitted with steel boxes of the marine type on the crank pin end, which are lined with anti-friction metal. The rocker end is forged solid, of the regular Corliss pattern and also fitted with steel boxes and adjustable wedges. The rocker beams are made of a strong grade of cast iron, well-proportioned throughout and fitted to the steel shaft. Pins to receive the connecting rod have extended arm with pin, to receive balance weight. The balance weight is of cast iron, and the guide bars in which it works are secured to the sides of foundations. The weight is sufficient to balance working parts, one for each engine.

The rocker connecting rod is of forged steel, made and fitted with boxes the same as the main rod. The rocker beam pins are made of forged steel, with large wearing surface to receive the two connecting rods and balance weights. The cross heads are of forged steel, the center turned to receive the connecting rod boxes, with extended ends for piston rods and guide blocks. The guide blocks are fitted with hard wood adjusted gibs.

The piston heads are made of cast iron and fitted with self-adjusting packing rings. Each air piston is provided with

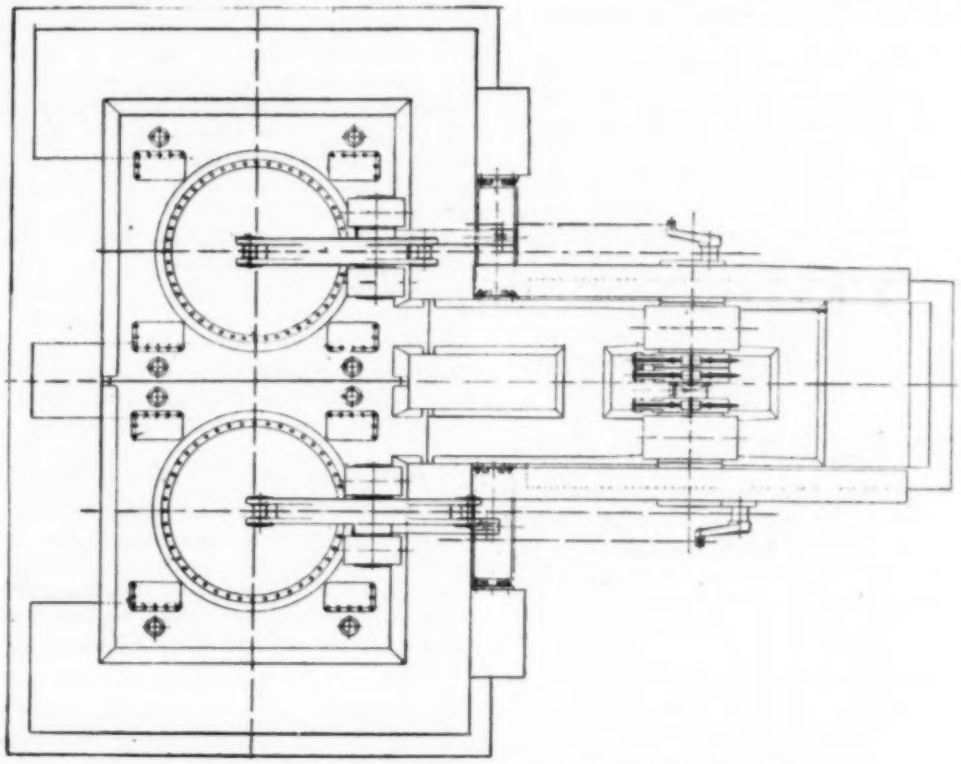


FIG. 3.—PLAN OF CROSS COMPOUND VERTICAL BLOWING ENGINE.

holes to receive air piston valve. The air cylinder heads are of circular box-shape, well ribbed internally and provided with piston valve openings. The upper head has two stuffing boxes for piston rod and openings for piston valves, and is flanged on top to correspond with lower side of the bed plate and securely bolted thereto.

The piston valves have diagonal openings. They are operated by levers, rocker shaft and return crank. The valve gear is of the latest improved release type. Each engine is controlled by one governor and they are so connected that either can be operated independently if required, and the speed changed while in motion. One eccentric is provided for the steam inlet valve connecting both cylinders, and a separate eccentric for the exhaust valve, allowing the compression to be adjusted as may be desired to suit the requirements without interfering with the inlet valves. Each engine has double wrist plate driven by a separate rocker shaft, one to work steam, the other, exhaust valves.

The air branches on the discharge side are made of cast iron, fitted to the cylinder heads to correspond with the valve opening. Each has a flange branch for pipe connection. The top cover has guides extending up sufficient height to guide the piston valve cross head. The receiver to low pressure is connected with each cylinder by flange connections and provided with the necessary valves so that high pressure steam can be worked in low pressure if found desirable, and also arranged so that the high pressure engine can be operated without the low pressure, making both engines entirely independent.

THE TIN PLATE MARKET.

The dull and uninteresting market mentioned last week has continued, and no trading of any volume has been done, buyers and sellers alike are awaiting developments. The only purchases made are small ones, to fill out depleted stocks and for immediate use. The indications are that there will still be a good demand for tin plates over the next six months, and it is generally believed that, war or no war, the canning trade will consume a much larger quantity of tin plates than has been contracted for up to the present time. With anything like normal demand it is probable that better prices will prevail for deliveries up to and including August.

The mills are well supplied with business and are running to their full capacity; in fact, it is difficult to obtain any plates for April or May delivery. The condition of the trade after October 1st, is an open question, and it is generally believed that the business will be overdone to such an extent that the competition will be keener than it is now and that a lower range of prices may prevail.

For deliveries June to December we quote, as follows, f. o. b., Pittsburg and Indiana districts:

CHARCOAL TINS.

	IC	IX
Calland Grade, tissue packed,	$4.00	$5.00
Allaway Grade,	3.40	4.30

COKE TINS.

IC, 108 lb. Basis weight,	$2.85
100 lb. " "	2.75
95 lb. " "	2.70
90 lb. " "	2.65
85 lb. " "	2.60
80 lb. " "	2.55

WORCESTER GRADE TERNES.

IC, 216 lb., 20 x 28	$5.80
200 lb. "	5.50
190 lb. "	5.40

For deliveries April, May and June, 5c to 7½c higher than prices mentioned above.

CREDIT should have been given our valued contemporary the *Marine Review* for the sectional view of the McMyler ore unloading machine at Conneaut, appearing in our isuse of March 31.

PERSONAL.

Major Malcolm McDowell, left Chicago last week for a trip of several weeks to the Pacific Coast, whither he is called as an expert in foundry work by one of the largest concerns in that section.

M. Ribarth, of St. Petersburg, Russia, is at the Homestead Steel Works, to examine the armor plate about to be turned out for the Russian government.

Chas. A. Boyd, superintendent of the Walker Co., of Cleveland, has resigned his position to enter upon general engineering work for himself, with offices in the American Trust Building, Cleveland. Mr. Boyd has been with the Walker Company for the past four years, starting as engineer in the railway motor department, and having charge of design and construction. A year later he was placed in charge of the entire engineering department, and was promoted to the position of assistant superintendent on Jan. 1, 1897. The following March he was appointed superintendent of the Cleveland works, having in charge both the engineering department and shops.

George B. Sennett, of Youngstown, manufacturer of the well known Sennett engine, has presented to the Carnegie Museum, of Pittsburg, a collection of polished agates from Mexico, besides a collection of valuable books on scientific subjects.

Peter McIlbreid, who retires from the superintendency of the Rankin plant of the American Steel & Wire Co., under the new management, was presented last week by the 900 employes of the plant with a gold watch and chain. Mr. McIlbreid, who has been superintendent at Rankin for seven years, is moving to Tennessee.

D. T. Williams, of the Lunkenheimer Co., Cincinnati, has returned from Europe.

Theodore Shaffer, of Pittsburg, who has been employed in the plant of the Monongahela Tin Plate Co., has been chosen by the advisory board of the Amalgamated Association of Iron and Steel Workers, to succeed M. M. Garland as president, Mr. Garland becoming surveyor of the port at Pittsburg, on May 1.

Andrew Carnegie's address after April 30 will be Skibo Castle, Sutherlandshire, Scotland.

Manager Preston, of the Buhl Steel Co., and the Sharon Iron Co., Sharon, Pa., has been succeeded by Nevin McConnell. Mr. Preston has made no new connection as yet.

E. W. Parker, coal and coke statistician of the U. S. Geological Survey, read a paper before the American Statistical Society, March 31, on "Advances in the Production of Pig Iron."

Thomas H. Taylor, formerly with the Washburn & Moen Mfg. Co., Chicago, is the new manager of the American Steel & Wire Co.'s Cleveland plant formerly owned by the American Wire Co.

Pipe Manufacturers' Meeting.

Representatives of the 14 leading wrought pipe interests of the country met in Pittsburg, Friday, April 8, and went over in detail the present situation in the market for their product. The pipe firms represented at the meeting were: American Tube & Iron Co., Youngstown, O., and Middletown, Pa.; A. M. Byers & Co., Pittsburg; the National Tube Works Co., McKeesport; Pennsylvania Tube Works, Pittsburg; Spang, Chalfant & Co., Pittsburg; Riverside Iron Works, Wheeling, W. Va.; Morris Tasker & Co., New Castle, Del.; Oil City Tube Works, Oil City, Pa.; Conshohocken Tube Co., Conshohocken, Pa.; Union Tube & Iron Co., Warren, O.; Oil Well Supply Co., Pittsburg; Cohoes Tube Co., Cohoes, N. Y.; Reading Iron Co., Reading, Pa.; Western Tube Co., Kewanee, Ill. Frank J. Hearne, of the Riverside Iron Works, Wheeling, was called to the chair. Final action on a permanent price agreement was deferred until a meeting to be held on May 4. Questions regarding differentials, deliveries and other points at issue were referred to a committee who will report at the May meeting. Meantime it is agreed to maintain a uniform price of six tens and five per cent off list, f. o. b. mills and with no freight allowance. The base discounts were reaffirmed as follows: Butt weld, black, 57 per cent off; lap weld, black, 67 per cent off; butt weld galvanized, 50 per cent off; lap weld, galvanized, 55 per cent off. Reports showed that the mills are busy and indications are that the price agreement can be held.

LAKE SUPERIOR IRON MINES.

Rumors of the purchase of various additional Mesabi range properties by the Oliver Iron Mining Co. have gone through the newspapers with many variations. There is no foundation for the statement that the Carnegie-Oliver interests are negotiating for any more Mesabi mines. The statement connecting the Duluth, Pillsbury and Franklin with the Pittsburg company doubtless grew out of the deal by which 300,000 tons of ore from these three properties will be taken this year, and production at the Mountain Iron, Mesabi Mountain and Lone Jack shortened that much. This arrangement, it is believed, opened the way for the starting up anew of the Franklin mine. The Bessemer shaft of this property has been opened and 90 men are at work. It is expected that the whole mine will be unwatered and worked this year and several hundred men employed.

It is several years since anything has been done at the North Aurora property on the Gogebic range, on which the Oliver Iron Mining Co. has taken an option recently. The mine adjoins the Aurora on the north and is just west of the Pabst mine, of the Oliver company.

The Duluth & Iron Range Road is delivering 5,000 tons of ore daily at Two Harbors docks, chiefly Chandler and Fayal ore. With 400,000 tons in Chandler stockpiles more room was imperatively needed.

The sale of the lease of the Zenith mine to the Oliver Iron Mining Co. is circumstantially asserted, the statement being made that $100,000 was paid. It may be positively stated that the Carnegie-Oliver interest has not taken the Zenith lease. Quite a number of old-range properties have been under consideration lately but none has been taken. The Zenith royalty is 30 cents and the lease has about 10 years to run, with a 30,000-ton minimum.

The Sellers mine at Hibbing, owned by Shoenberger, Speer & Co., and the Carrie Furnace Co., Pittsburg, has been examined lately by the Lake Superior Consolidated Iron Mines with a view to purchasing it, but no deal has been closed as yet, so far as official advices go. The Sellers was not operated last year, nor was the stockpile shipped.

New Open-Hearth Furnaces at Homestead.

The first heat in the new open-hearth addition to the Homestead Steel Works was made last Friday and on Monday morning five of the ten furnaces were put in operation. The remaining five will follow next Monday. The ten furnaces are each of 50 tons capacity and are a part of the 16 originally planned. The building of the remaining six will follow before long.

THE Carnegie Steel Co. recently placed an order with Robert Wetherill & Co., of Chester, Pa., to rebuild and enlarge the Corliss engine in its Homestead mills. This engine was 54x72 inches, and one of the largest of that type in the world. The casting for the new cylinder weighs 46,430 pounds, and will finish 60 inches diameter by 72 inches stroke. It was cast at the West Point foundry of J. B. & J. M. Cornell, of New York.

ROGERS, BROWN & Co. say: "The flood that visited the Ohio Valley has receded, and the foundries and mills affected have been able to resume operations. The gathering war clouds have not cast serious shadows upon the iron industries of the country as yet, and the trend of trade continues normal. The manufactories, as a rule, are in active operation, and are not alarmed over the possibilities of war, many feeling that the conflict, should it come, will not be protracted, and that the country will emerge from it with increased prestige and power. The sales of the week have been numerous, and comprehend about every variety of iron. Though the orders have not been for large quantities, several have been for scattered forward deliveries, evidencing confidence in the future. Prices remain unchanged."

THE name of David Z. Norton, a well known iron ore dealer, of Cleveland, will be borne by the steel schooner just built for the Wilson Transit Co., and launched at the Globe Iron Works shipyard, Cleveland, on April 9. The boat was christened by Miss Miriam Norton.

THE FOUNDRYMEN'S ASSOCIATION.

The regular monthly meeting of the Foundrymen's Association was held at the Manufacturers' Club, Philadelphia, on Wednesday evening, April 6, with President Wanner in the chair.

Secretary Evans announced that the executive committee had no special report to make, except that business was very much better than it had been. He announced the name of George T. Johnson, Philadelphia agent for the Andover Iron Co., as an applicant for membership. Mr. Johnson was unanimously elected. The treasurer reported a balance in the treasury of $1,680.57, and all bills paid.

Mr. Evans then called upon the members present to give their views upon the condition of trade.

John Fitch, of Hanover, said that business was very much improved.

Mr. McArdle, of Plainfield, N. J.: "Our works are in a very flourishing condition, and all the shops in our neighborhood are prosperous."

Mr. Messick, of the Pusey & Jones Co.: "We have plenty to do; much more than at this time last year."

Mr. Stirling, of Harlan & Hollingsworth: "The outlook down our way is splendid, and there is every prospect of even better times."

Mr. Sites, of York: "We have more work than we can attend to. So much so, that just as soon as I get home again, I propose to start night work."

Mr. Harper, of Chester: "Steel castings are booming, and every shop in our vicinity is full of work. We have all we can attend to, and some other shops, within my knowledge, are simply over-crowded with work."

Mr. Moore, of Stanley G. Flagg & Co.: "We are running day and night, and are taking all the molders we can get."

Mr. Insley, of the Link Belt Engineering Co.: "We are using a great many castings, more than ever before."

Mr. Wright: "We have a great volume of business, but prices are unsatisfactory."

Mr. Johnson: "Our foundries are in good condition."

Mr. Davies: "Business is fair, but prices are not what they ought to be."

Mr. Pole, of Bement, Miles & Co.: "We are extremely busy, with all the work we can possibly attend to."

Mending a Broken Roll with Cupola Steel.

Mr. Evans then read the following memorandum concrerning an achievement of Henry Challingsworth, of the Phoenix Iron Co. Phoenixville, Pa. A blue print was also submitted, from which the accompanying cut is made:

"Mr. Henry Challingsworth, superintendent of the Phoenix Iron Co.'s foundry at Phoenixville, Pa., is the first man to accomplish the feat of splicing a 24-inch steel beam roll with steel melted in an iron cupola. In December, 1897, a 10-inch beam 'top roll' in the Phoenix Iron Co.'s three-high 24-inch mill snapped short off at the shoulder, the fracture being nearly vertical. The roll was handed over to Mr. Challingsworth at the foundry, who proceeded, by his own method to splice the same. He completed the job and the roll was dressed and returned to the mills, where it has now been steadily at work for over three months and is pronounced to be in every way a decided success. The roll was 5 ft. 6 inches long; 24-inches diameter—with 12 inch and 10 inch bearing and standard connections." Mr. Harper remarked that he had frequently seen pieces welded upon steel castings, and it was the consensus of opinion among the members that Mr. Challingsworth's feat, as briefly stated, was not particularly remarkable.

An extremely interesting paper, by George E. Matlack, of the Cramp Ship & Engine Building Co.'s foundry department, on "A New Patent Pneumatic Rammer," was then read by Persifor Frazer, Jr. Mr. Frazer prefaced his reading with a few remarks on the foresighted policy of Congress which made it necessary for the Government in the present crisis to rush to foreign countries to buy warships much inferior in every way to those made here. He thought the present war scare offered a bright outlook for the foundry trade.

After the reading of the paper, which will be found on another page of this issue, Mr. Evans asked Mr. Pole if he thought the rammer could be used satisfactorily in green sand work?

Mr. Pole: "Well, I have had eight men on that work. This machine I think would improve upon their work wonderfully."

Mr. Stirling: "Is the machine on the market?"

Mr. Cramp: "Not yet."

A discussion followed between Mr. Matlack and Mr. McArdle relative to the advisability of using a pene rammer with the new machine, to follow it up. Mr. Matlack argued that it was not necessary. "You can use a round, square or oblong rammer, as you please," said he, "and need no outside assistance."

Mr. Stirling: "What is the weight of the machine?"

Mr. Cramp: "About 560 pounds."

Mr. Evans: "Would it be possible to run it with steam?"

Mr. Matlack: "Yes, but air is preferable."

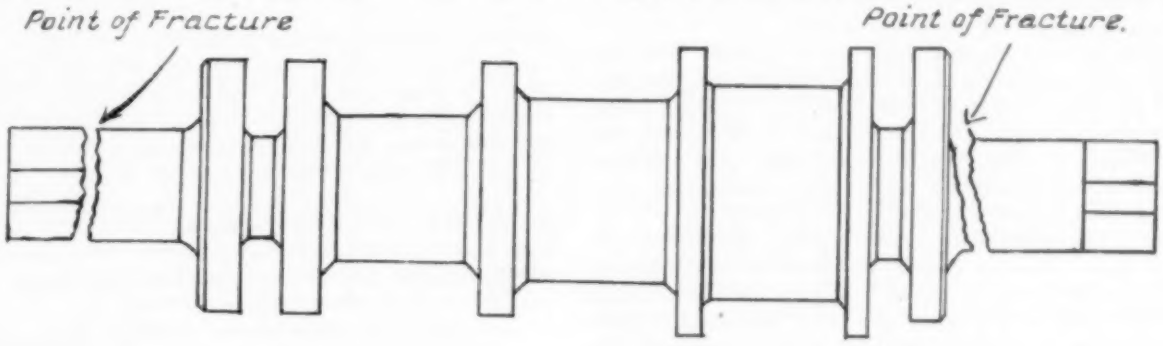
Mr. Wanner: "Could it be used for water pipe?"

Mr. Matlack: "Yes, several pipe men have seen it, and think very well of it."

Mr. Evans: "Now, just suppose a small foundry, where they have no compressed air plant, but have a traveling crane. What sort of rig would they need to operate this machine, and what would it cost?"

Mr. Matlack: It would cost, say, $250 for a compressor; the rigging up of a crane would cost $50 to $60. We are not prepared as yet to give the cost of the new machine. That hasn't been definitely fixed."

Mr. Messick said he thought the machine a good thing and incidentally remarked that compressed air as a power has come to stay.


Point of Fracture
Point of Fracture.
Steel Roll spliced with steel melted in an iron cupola.
Steel Roll spliced with steel melted in an iron cupola.

MENDING A BROKEN ROLL WITH CUPOLA STEEL.

NEED OF GREATER UNIFORMITY IN PIG IRON ANALYSES.†

BY THOS. D. WEST.

While the past four years have witnessed a greater revolution in foundry practice than any like period, methods of making mixtures were never in the plight in which we find them to-day. The recent introduction of chemistry in founding has brought a realization of the impossibility of accurately judging the grade of an iron from fracture; yet there is still a prejudice with many against chemical analysis as a determiner of grades or as a basis for making mixtures. It is unfortunate that there are features involved in such analyses that give the opponents of chemistry some ground for throwing doubt upon it. All improvements have to combat with more or less prejudice and difficulty before they can establish themselves. For this reason those who know from experience the value of working by chemical analyses, should not be discouraged or sit still and let the retarding influences have full sway. The thing to do is to determine the factors that tend to prevent the general use of chemical analyses, and work to correct what needs correcting. The writer knows from experience some agencies that retard the general utilization of chemical analyses in making mixtures and in connection with this paper will cite a few of them.

At the outset two considerations may be stated: First, the founder who continues to make mixtures by judging the fracture of pig metal, will find that the iron in his castings is not always what he would like to have it and will often cause him heavy losses. Second, the principles underlying chemical analyses are established and their correct application gives the greatest assurance of attaining desired ends.

What is best to do, retain the old practice, or strive to perfect the new? This is a question that interests the maker of pig iron, as well as the consumer; for if the blast furnaceman can remove thereby any of the grounds of complaint by users of his product, he certainly has much to hope for from any progress toward perfecting analyses in making mixtures of iron. In one sense, the use of chemical analyses is but a comparative method, a guide to desired ends in making mixtures. With a certain percentage of silicon, sulphur, phosphorus, manganese and carbon in iron, other conditions being alike, as to fuel, etc., the progressive founder knows very closely just what physical results he may expect from his mixtures. If all the procedures have been correct, he will get expected results, but the difficulty lies in the possibility of error. For example, if a founder has been receiving metal from one furnace that has a careful chemist and correct methods for determinations, he will obtain—providing no errors have been made in the shipment or charging of iron—the results he counted on, in making his mixtures. But should this furnace change chemists or the founder secure iron from another furnace—changes occurring every day—we then find conditions that may destroy the comparative results of past practice in making mixtures. Such changes often cause bad castings or castings lacking in the physical properties desired, and may result in the furnaceman being censured or losing his trade. The trouble would have been avoided had the founder understood how to allow for the new chemist's methods of analysis.

TABLE 1.—COMPARATIVE ANALYSES OF FOUNDRY IRON.

No.	Laboratory.	Sil.	Sul.	Phos.	Man.	G. C.	C. C.	T. C.
1	*A	1.95	.011	.60	.63	3.35	.48	3.83
2	B	2.00	.010	.543	.56	.....	.....	4.27
3	C	2.02	.0045	.615	.56	2.99	.64	3.63
4	D	2.05	.010	.59	.69	3.20	.52	3.72
5	E	2.05	.007	.59	.60	3.41	.45	3.86
6	F	2.06	.011	.617	.62	.....	.....	3.85
7	G	2.06	.013	.579	.....	.....	.....	.....
8	H	2.11	.011	.617	.54	3.12	.80	3.92
9	I	2.13	.006	.503	.56	3.04	.44	3.48
10	J	2.158	.018	.....	.....	.....	.....	.....
11	K	2.16	.015	.612	.550	.....	.....	.....
12	L	2.19	.012	.591	.594	3.29	.82	4.11
13	M	2.21	.008	.61	.46	2.82	.36	3.18
14	N	2.21	.018	.600	.546	3.59	.32	3.91
15	O	2.22	.020	.54	.59	3.32	.25	3.57
16	P	2.224	.018	.603	.59	3.42	.29	3.71
17	P	2.219	.019	.614	.60	3.45	.23	3.68
18	P	2.228	.017	.610	.58	3.36	.40	3.76
Greatest Variation.		.27	.0155	.114	.23	.77	.59	1.09

*Corresponding letters in the four tables signify that analyses are from the same laboratory or firm.

† Read by title before the Pittsburg Foundrymen's Association, March 28, 1898.

TABLE 2.—COMPARATIVE ANALYSES OF BESSEMER IRON.

No.	Laboratory.	Sil.	Sul.	Phos.	Man.	G. C.	C. C.	T. C.
19	A	2.12	.060	.088	.73	3.19	.75	3.94
20	C	2.15	.048	.094	.93	2.78	.85	3.63
21	D	2.20	.056	.086	.91	3.10	.64	3.74
22	F	2.21	.051	.093	.95	.....	.....	3.81
23	S	2.25	.058	.090	.90	.....	.....	.....
24	E	2.29	.048	.080	1.09	3.14	.57	3.71
25	R	2.30	.051	.087	.910	3.46	.50	3.96
26	B	2.31	.056	.083	.89	.....	.....	3.80
27	K	2.31	.060	.0865	.890	.....	.....	.....
28	O	2.32	.051	.086	.84	3.06	.25	3.31
29	L	2.32	.055	.111	.809	3.51	.84	4.35
30	Q	2.37	.058	.087	.83	2.92	.82	3.74
31	P	2.445	.064	.086	.93	3.15	.67	3.82
32	P	2.402	.060	.084	.98	3.20	.68	3.78
33	P	2.413	.060	.086	.96	3.12	.72	3.84
Greatest Variation.		.32	.018	.031	.36	.73	.60	1.04

TABLE 3.—COMPARATIVE ANALYSES OF CHARCOAL IRON.

No.	Laboratory.	Sil.	Sul.	Phos.	Man.	G. C.	C. C.	T. C.
34	D	.95	.019	.89	1.76	2.90	.78	3.68
35	A	.97	.017	.96	1.77	3.10	.88	3.98
36	L	.97	.013	.929	1.795	2.94	.91	3.85
37	K	.98	.016	.91	1.80	3.01	.79	3.80
38	R	.98	.022	.957	1.98	3.23	.60	3.85
39	C	.99	.016	.956	1.90	2.84	1.02	3.86
40	T	1.00	.016	.952	1.90	2.69	.48	3.17
41	F	1.02	.017	.948	1.93	.....	.....	3.95
42	B	1.04	.021	.906	1.83	.....	.....	3.76
43	N	1.09	.033	.932	1.768	3.30	.44	3.74
44	P	1.161	.027	.931	1.85	3.20	.56	3.76
45	P	1.152	.025	.930	1.89	3.28	.44	3.72
46	P	1.157	.024	930	1.90	3.25	.48	3.73
Greatest Variation.		.21	.020	.067	.22	.61	.58	.30

TABLE 4.—FIRMS AND CHEMISTS FURNISHING COMPARATIVE ANALYSES.

Laboratory.	Analyses	Concerns Furnishing Analyses.
A	3 Sets.	Buffalo Furnace Co. Buffalo, N. Y., Frank Hersh, Chemist.
B	3 Sets.	Carnegie Steel Co., Cochran, Pa., J. M. Camp, Chemist.
C	3 Sets.	Tennessee Coal, Iron & Railroad Co., Birmingham, Ala. J. R. Harris, Chemist.
D	3 Sets.	Embreville Iron Co., Embreville, Tenn., F. E. Thompson, Chemist.
E	3 Sets.	Phillips Testing Laboratory, Birmingham, Ala.
F	3 Sets.	Illinois Steel Co., So. Chicago, Ill.
G	1 Set.	Spearman Iron Co., Sharpsville, Pa., W. E. Dickinson, Chemist.
H	1 Set.	Thomas Iron Co., Hokendauqua, Pa.
I	1 Set.	Everett Furnace, Everett, Pa., F. R. Bennett, Chemist.
J	1 Set.	Booth, Garrett & Blair, Philadelphia, Pa.
K	2 Sets.	Crane Iron Co., Catasauqua, Pa., H. A. Knauss, Chemist.
L	3 Sets.	Hamilton Furnace Co., Hamilton, Ontario.
M	1 Set.	James C. Foster, Sheffield, Ala.
N	2 Sets.	Warwick Iron Co., Pottstown, Pa., Wm. A. Stephan, Chemist.
O	2 Sets.	Andrews & Hitchcock Iron Co., Youngstown, Ohio.
P	9 Sets.	Dr. R. Moldenke, Met. Eng., Pittsburg, Pa.
Q	1 Set.	Bethlehem Iron Co., So. Bethlehem, Pa., A. L. Colby, Met. Eng.
R	2 Sets.	Claire Furnace Co., Sharpsville, Pa., D. K. Smith, Chemist.
S	1 Set.	Stewart Iron Co., Sharon, Pa., E. R. Sanborn, Chemist.
T	1 Set.	Superior Charcoal Iron Co., Detroit, Mich., W. P. Putnam, Chemist.

Two other factors are to be mentioned that affect the value of analyses: The character of the chemist's work and the purity of the chemicals used. Serious harm may be done by a careless chemist and such men should have no place in a chemical laboratory. Mistakes are liable to happen with any man, but where one is indifferent to them, no consideration should ever be extended. The strength and purity of chemicals is an important matter also. To guard against variations in this regard, all chemicals are tested when received, and the impure rejected. To determine the variation due to the method and to personal factors, the practice of standardizing drillings is followed. A chemist will first obtain from five to 20 pounds of clean, fine, well mixed drillings, out of which he will send samples for analysis to four or more chemists of known ability and accuracy in their work. The reports of these analyses may be two to five months in coming back. When all are received, he will accept the average as a standard. The labor and expense involved in procuring standardized drillings for, testing chemicals or analyses are considerable, and suggest the question, Why cannot a central laboratory be maintained where all chemists dealing with cast iron could obtain standardized drillings, promptly and at a price comparatively

small? As the writer is surrounded by blast furnaces and their laboratories, he has often thought of the steps that might be taken toward the establishment of such a standardizing laboratory for furnace work and iron founding.

In a paper read at the November meeting of this association, the writer solicited the addresses of chemists willing to analyze drillings, so that the results could be checked up and compared. It was surprising the great interest manifested in the work. As a result of this call, the writer has the pleasure of presenting in this paper, 46 sets or 273 separate analyses, from leading laboratories in the different iron working sections of this country and one from Canada. The samples the writer selected for the drillings lie before you on the table. Here are three pieces of pig about 9 inches long, having ¾-inch holes drilled about 2½ inches deep from the face down, and as close as they could be obtained. The drillings from these samples of foundry, Bessemer and charcoal pigs respectively, were kept separate and those for each pig thoroughly mixed, so as to ensure that all samples sent out were exactly alike, as far as it was possible to get them by the use of pig metal. Pig iron was selected in place of making any special castings, so as to test particularly the ordinary practice followed at blast furnaces, in taking drillings from pig metal.

The writer's thanks are tendered to the various firms and chemists mentioned in Table 4, for so kindly furnishing the analyses seen in Tables 1, 2, and 3. It has taken no small expenditure of time and money to obtain these analyses and it is to be hoped that the end sought by this paper will lead all the contributors to feel that their labors have been devoted to a good cause.

Considering that drillings were taken from pig metal, which are not as good for checking purposes, as those taken from a clean, especially prepared and solid casting, and that there is no uniformity of method in analyses at the present time, the close results seen in Tables 1, 2 and 3 are very creditable to the various chemists and demonstrate that great care was exercised by all. In justice to the donors of these analyses, it is to be said that the analyses given by the respective firms and chemists may not represent half of their work, as checks were run on the analyses reported to make sure no error had been made. To illustrate what is meant by "checks" the last two analyses of each table are cited, which are Dr. Moldenke's checkings. This is, of course, more exacting practice than is generally carried on in the daily routine work of furnace laboratories. For this reason, a much greater variation in the analysis of pig iron as it leaves the furnace yard for the foundry may be expected than is shown by Tables 1, 2 and 3.

The first suggestion that will come to the practical furnaceman and founder in studying Tables 1, 2 and 3 (which are arranged according to the variations in the silicons), is whether the variations found in the analyses of the respective pig metals are sufficient to have any serious effect on their comparative value, when applied to making mixtures of iron. To aid in seeing clearly what are the greatest variations to be found in the analyses shown, attention is called to the last line of each table. In Table 1, there is an actual difference of .27 for silicon, .0155 for sulphur, .114 for phosphorus, .23 for manganese and 1.09 for the total carbon. Table 2 shows a variation of .32 for silicon, .018 for sulphur, .031 for phosphorus, .36 for manganese and 1.04 for total carbon. Table 3 shows .21 for silicon, .020 for sulphur, .067 for phosphorus, .22 for manganese and .30 for total carbon. When such a difference is to be found in analyzing pig metal where the greatest care and skill has been exercised as exhibited in Tables 1, 2 and 3, what are the chances to be run in accepting analyses made by the different rapid methods in the rush of every day furnace practice? Here we have, with the best of care and skill, a variation in the ingredients, mainly due to a lack of uniformity in laboratory methods and of a standard for analyses sufficient to affect two-thirds of all the castings made, causing them to be either bad, or ill-suited for the use for which they were intended.

Is it not time that furnacemen and foundrymen were awakening to the necessity of co-operating to secure greater uniformity in the methods of making chemical analyses and in establishing a central standardizing agency?

The writer holds a descripiton of several of the methods used for obtaining the analyses shown in the tables and chemists who have seen them could outline their reasons for giving different results. As the writer is not a chemist, he does not assume to discuss anything regarding their work. Some good work is now being done in this line by a committee headed by the eminent Dr. C. B. Dudley. It is to be hoped that the near future may see such a co-operative agency as that referred to, so that it may be patronized by all chemists employed in the manufacture or use of cast iron.

This paper will be discussd at the coming meeting of the Pittsburg Foundrymen's Association, April 25. The writer kindly urges all furnacemen, chemists and founders favoring the establishing of such a central standardizing laboratory as is here suggested, to send a few lines expressing their sentiments, to the association secretary, Mr. F. H. Zimmers, West Carson st., South Side, Pittsburg.

The New King & Andrews Co. Foundry.

The King & Andrews Co., the removal of whose plant from Chicago, 226 N. Union st., to Chicago Heights, a manufacturing suburb of Chicago, as announced recently, has completed the plans for the new foundry and commenced work on it. The plant is to be modern in every detail, and it is thought will be as nearly a model foundry as can be built. The main building, 200 feet by 130 feet and 45 feet high in the center, is to be well lighted by skylights and windows. The entire floor will be used for molding and casting, and the main portion, 200 feet by 100 feet, will be entirely clear with the exception of the crane supports. On the west side of the main floor is the charging platform, to which will be delivered from trestles all the fuel and supplies used in the foundry. From the platform, which is 20 feet in the air, the material can be delivered wherever wanted in the shops.

The foundry is served by three steam power jib cranes of 25-ton capacity each, built by the Coal Handling Machinery Co., of Chicago. The three cupolas, 84-inch, 72-inch and 56-inch, are located under the charging platform. In this part of the building is the power plant, of 100 h. p., furnished by the Atlas Engine Works, of Indianapolis, Ind. The core ovens and core rooms are also under the charging platform. Of the former there are four. One is 24 feet deep, 15 feet wide and 15 feet high, and 18 feet deep, 10 feet wide and 10 feet high, and two are smaller. The intention is to use coke or coal for core oven fuel, but it is possible arrangements may be made for the use of oil.

On the east side of the main building are surface railroad tracks for the delivery of the products of the plant. Surface tracks also run all through the yards and the foundry. The tracks on the east side of the main building are served with a steam derrick. The pattern storage building is 50 by 30 feet, two stories high, and is located at the north end of the main building. The pattern, carpenter and machine shops are on the east side of the main building, in a building 25 by 150 feet. The machine shop is supplied with a heavy roll lathe and some smaller tools. The main office of the King & Andrews Co. will be at the works, but it is also the intention to have a city office in Chicago. Chicago Heights has three railroads, the Michigan Central, C. & C. I. and the E. J. & E., giving access to all the trunk lines of the country.

The King & Andrews Co. has made a specialty of semi-steel castings and anti-acid vessels, and also makes sand and chilled rolls and heavy rolling mill and tin plate work. With the new plant finished, the company will take a position as one of the leading manufacturers of its class in the country. The increase of tin plate and rolling mill work in the Western States will make an important addition to its business.

Large welded steel pipes have been adopted for the Birmingham (Eng.) Water Works. These pipes are 42 inches diameter and 24 feet long, and the thickness varies from ⅝ to ⅛ inch, according to pressure to be resisted. Siemens-Martin mild steel will be used, and the test-pressure is 600 lbs. per square inch. In all, 7,000 tons of this pipe will be made within the next two years by Thomas Piggott & Co., of the Atlas Works, Spring Hill, Birmingham.

At West Superior, Wis., the pipe foundry connected with the steel plant has been put in operation again.

A PORTABLE PNEUMATIC RAMMER.*

BY GEO. C. MATLACK.

No doubt many of my hearers have stood frequently over a deep pit in a foundry, and watched with curious interest a gang of laborers ramming up in an aimless, monotonous fashion some large mold and wondered that in this age of advanced mechanical ideas no one has thought to apply to this class of work some device which would take advantage of the great field for economy. The new rammer, which has come in response to this call is from the brain of a thoroughly practical mechanical man, whose knowledge of the advantage of labor saving devices, and the proper application of them has been derived from a wide and varied experience. The man to whom I refer is Mr. Joseph C. Cramp, superintendent of the power and plant repair department of the Wm. Cramp & Sons' Ship & Engine Building Co., of this city. It was therefore, quite proper and natural that the idea of introducing an article of such mechanical neatness and such commercial value should have originated in the mind of a thoughtful and practical man.

Convinced that it was in his power to perfect a machine with perfect ease to any portion of the pit to be rammed. Power is supplied through a flexible hose tapped from the

PATENT PNEUMATIC RAMMER.

that would be of inestimable value to me in the foundry, I kept nagging at him on the subject, and about a year ago I succeeded in getting him enough interested to put his ideas and thought into tangible shape, the result of which is this portable pneumatic rammer, which will practically revolutionize loam molding, and to a great extent large green sand work. For fully a year Mr. Cramp worked and puzzled and struggled on, I criticizing, Mr. Cramp trying again and again, disappointed but not discouraged, until at last he succeeded in giving me a tool that left nothing to criticize, and the rammer was a success.

The portable rammer consists of two vertical cylinders, held apart by stanchions containing pistons driven either by steam or compressed air, which is regulated by a simple but ingeniously contrived Corliss valve. The size of the cylinder is 3½ inches, the length of stroke is 4½ inches, and with an air pressure of 35 lbs. per sq. inch at the piston, it strikes 200 blows per minute, each blow with the butt rammer head covering an area equal to seven times the area of an ordinary hand rammer.

This device, which at once must suggest itself as scientific and practical is suspended from a turnbuckle which is attachedto a trolley on a movable crane, so as to enable it to move main pipe, running the entire length of the foundry. The crane is portable and can be shifted to any column, thereby covering any spot in the shop.

For the last two months, it has been in successful operation every day, ramming up molds of all manner of shapes and sizes and weights—indeed it seems almost impossible to describe and explain the vast amount of work it does and the labor saved. There are very few molds that I have ever seen that by the use of this tool cannot be rammed up in one day. I am making at present some very large pumps that require a pit 30 ft. long, 14 ft. wide and 8 ft. deep. According to our regular practice it would take about 25 men three days to ram it up ready for casting. With two machines and twelve men I very easily rammed it up in one day, not only saving in money paid for labor, but casting two days earlier, thereby saving considerable time in the room occupied by this mold. I also find that it increases the capacity of my ovens, for I am able to cast the mold faster after they are dried, and do not have to wait for floor space to put the molds after they are dried.

* Read before the Foundrymen's Association, Philadelphia, April 6, 898.

The rammer itself is very simple and as yet has never gotten out of order, but is always ready. There are no breakdowns or giving out of little things, as very often occurs in new mechanical devices, causing constant irritation to a foreman.

Most any loam mold, with four men, can be rammed up in a day. By this I mean any large mold, say 10 ft. in diameter, and 6 to 8 ft. deep. Of course small ones can be rammed up in correspondingly quick time and the ramming is more even and far superior to that done by hand. As you all know, laborers, when ramming a mold, do so in a sort of aimless way. When the foreman's back is turned, the blow struck is not very hard, and very often the casting strains considerably. Any casting rammed up by this tool will be fully 10 per cent less in weight than when rammed by hand. I have been able to reduce materially my laboring force since using the rammer, and thereby reduce the running expense of the shop; for when I have no ramming to do the machine is idle and at no cost, whereas when hand is used you have the men around the shop drawing their pay just the same. Any tool in a shop to-day that will allow you to do away with men is a money saver, even if it does not do work any cheaper, for the correct and great idea in the management of any business to-day is to have as few men as possible in your shop when you are able to supplant them by modern tools, since there are always lulls and times when you have surplus labor. It may be for a couple of days or it may be for a few hours,—we try to keep the men employed on odds and ends because we see we will want them in a few days. I know every foreman present will concur with me on this point.

I have been experimenting with the rammer mostly on ramming up loam molds, but since it has proved its great value there, I have been introducing it lately on large green sand work. In bedding in large green sand work, you all know the main point is to have a good evenly rammed bed under it. Thus the rammer will do far superior and far quicker work than by hand.

The firmness of the ramming is at once made evident when you come to vent your bed. Any one present who has made large castings in green sand will appreciate at once the ramming of the bed in two to three hours that ordinarily would take two molders and helpers one to two days, and then not done as well as when using the rammer.

I am at present having some pene rammers made to put on in place of the butts; I will then commence ramming the molds up completely with the machine. Such is my faith in it that I have no doubt that in a few months all of my large castings in green sand will be rammed up with this new tool—that is, with the exception of the cope. How many of you present have hoisted out a large casting, and after digging out the pit, taken out your cinders and plates, have found a large hole in your floor confronting you. You may need this floor space badly, but you have no men to spare to ram it up, and you either have to do it at night or wait until you can spare the laborers to do it. Right here is where the rammer comes in. You can always spare two men—one to run the machine and one to fill in the sand—and in a very short time you have your pit rammed up even with your floor, there being no soft places for the next casting put there to strain, but a good hard evenly rammed floor.

With this rammer, whether the force of the blow is equal to 300 pounds or one pound—which can be very easily regulated by the turn-buckle—every blow struck will be of uniform force, consequently the sand will be rammed evenly and with the same force throughout every inch of its surface, and no straining of the metal in casting can possibly occur.

Another strange thing about the rammer: Although you use it for ramming up your molds you can change it and use it to dig your pit out by simply putting on a rammer with prongs. This will go around and break up the sand so that it can be very easily shoveled out. Instead of having hard digging you simply have shoveling.

I have already touched lightly on the advantage of reducing as much as possible the force of men employed in a foundry, or in fact in any establishment, and if you will permit me to enter a little more deeply into this subject, I will give you some reasons.

First of all, the fewer men you employ the smaller and less complicated is your pay-roll; the more will your foreman be

relieved from enforcing discipline and surveillance, and be able to devote his time to perfecting his work. There will be less likelihood of strikes occurring and less damage if they should occur. A machine that will do the work of a man in the same time is more valuable than that man. But this tool will do the work of 15 or 20 men, and not only do it better but in far less time; and when done you simply close a valve and it is at rest until you need it again.

Before I close allow me to express my views on the subject of compressed air. I said that this rammer could be run either with air or steam, but for ramming in a foundry compressed air is far better power. The day is not far distant when it will be more widely used in all of our foundries. The pneumatic chipping tool has come to stay, and although my first experience with it was not favorable, I have changed my mind since getting the right tool, and I can fully commend its utility and cheapness in chipping castings. The sand blast is another appliance that can be attached economically to any air compressor and do good work. Most of you appreciate the use of air hoists, and I think a traveling crane run by air will give more satisfaction in most foundries than one run by electricity, for the simple reason that a crane run by air is not so complicated and does not need such skilled labor to run it or keep it in repair. Most any machinist understands air, and very few understand electricity. In our foundry this is not so apparent, as we have a corps of electricians at work all the time on the ships, and these are at my disposal at once in case of a break-down; but I presume most of the foundries are not so favored.

My idea in referring to the use of air is to emphasize the fact that installing an air plant to run the rammer is a very useful and paying investment, for you will be greatly surprised at the many things to which you will be constantly applying this power.

1,000 Steel Cars for the Pennsylvania Co.

Orders for steel cars for mineral traffic keep up in a way that indicates the firm hold the steel hopper type has taken upon the favor of railway construction departments. The latest contract is for 1,000 cars of the ore and coal hopper pattern, given on April 6 to the Schoen Pressed Steel Co., by the Pennsylvania Co. These cars will be 33 feet long and 10 feet high from the top of the rail. In executing the order the Schoen company's plant will be run at full capacity. What the significance of the steel car movement is to the iron trade may be judged from the fact that upwards of 8,000 tons of steel will be required for the contract in question. The cars will weigh 37,000 pounds each and will carry 104,000 pounds.

THE Correspondence School of Technology, of Cleveland, has lately been consolidated with the Institute for Home Study of Engineering, also of Cleveland. The schools were started in 1894, and have been carrying on their work successfully. Prof. E. P. Roberts, of the Correspondence School of Technology, is technical director, F. D. Leslie, business director, and J. H. Norton, secretary and treasurer of the Institute under the new management. The two latter gentelmen have been connected with the Institute for Home Study of Engineering from its inception These schools were the first to give electrical courses by correspondence. The Institute for Home Study of Engineering has confined its efforts to electrical and mechanical work, while the Correspondence School of Technology has had courses in electrical, mechanical, civil, bridge and hydraulic engineering. All of these courses will be carried on by the consolidated institution, under the name of the Institute for Home Study of Engineering, the engineers and instructors who have been connected with both continuing in their respective departments.

AMONG the companies receiving Government contracts for furnishing disappearing carriages for the 8, 10 and 12-inch guns, emplacements for which are now being constructed at the seacoast fortifications, are the following: The Bethlehem Iron Co., the Southwark Foundry & Machine Co., of Philadelphia, the Walker Co., of Cleveland; the Morgan Engineering Co., of Alliance, O.; the Pond Machine Tool Co., of Plainfield, N. J.; and the Robert Poole & Sons Co., of Baltimore.

AN ENGLISH VIEW OF OUR FURNACE PRACTICE.

A. P. Head, of London, who has visited the United States a number of times, being associated with his father Jeremiah Head as consulting engineer, contributes an article to the London *Iron and Coal Trades Review* on American blast furnace practice. We make the following extract:

"So much has been written about American blast-furnaces that the author doubts if he can say anything new. As is well known, the leading characteristics are high blast pressure, moderate internal dimensions, ample stove power, and large outputs. The blowing engines are usually driven at a definite speed, a fixed quantity of air being thus forced in per minute, rather than a certain pressure being maintained. The latter may vary according to chance obstructions. A blast-furnace plant in the Mahoning Valley, typical of ordinary American practice, comprises two furnaces, 77 feet high, 19 feet 6 inches diameter of bosh, 10 feet diameter hearth, each being furnished with four hot-blast stoves on the three-pass principle, 70 feet high by 19 feet diameter. The output is 250 tons per day per furnace, or 1,750 tons per week each. The blowing engines work at 90 revolutions, the air-pressure varying from 8½ to 11 lbs. per square inch. The lining of such a furnace lasts four years, after producing 270,000 tons of pig-iron. This compares unfavorably with Cleveland (England) practice, where in one case a lining lasted 18 years, after producing 500,000 tons of pig iron from local ore.

"The furnaces above described, while representing average American practice, bear no comparison to the later developments, especially in the Pittsburg district. The Isabella furnace, the Lucy furnace, and various furnaces at the Edgar Thomson Works, have each in their turn become renowned for record-breaking outputs. At present, the four new Duquesne furnaces of the Carnegie Steel Co. head the list.

"The average cost of an American blast-furnace plant, comprising one furnace with all accessories, and with a capacity of, say, 2,000 tons per week, is £60,000. In England a pair of furnaces of the Cleveland type, with all accessories, capable of making 1,000 tons of pig-iron per week each, from Spanish hematite containing 50 per cent of iron, costs about £60,000, exclusive of land, or £30,000 per 1,000 tons of pig-iron per week. This is the same figure as quoted above for the American plant, except that the latter deals with 63 per cent ore. If this were reduced to 50 per cent, to be comparable with the English plant, the output would be reduced approximately in proportion, raising the capital outlay from £30,000 to £38,000 per 1,000 tons per week, and making the American plant somewhat more expensive than the English. The American principle, however, is to spend cheap capital on mechanical devices to save dear labor, with the result that at the Duquesne furnaces, where this principle is carried to its logical conclusion, the cost of labor is said to be 1s. 8d. per ton of pig-iron. It may be questioned, however, whether it would not be more economical to duplicate the number of furnaces, and make each one-half the present capacity, since blowing power and stove power, and bin and stockyard accommodation would be the same in either case, while wear of furnace lining would be much reduced. Doubtless, the striving after large outputs from one furnace is due rather to rivalry between furnace managers than to economy, either in working expenses or in capitalization."

FOR the annual convention of the American Foundrymen's Association, to be held in Cincinnati, June 8, 9 and 10, the following committees of Cincinnati, Dayton and Hamilton foundrymen have been appointed: Finance—J. W. Foley, George B. Morris, Lincoln Haney, Charles Lang and J. D. Smith. Entertainment—A. G. Wilson, S. H. Whittaker, John Hill, B. F. Haughton, Charles Greenwald, S. E. Hilles, C. H. Domhoff, Henry Sheu, Henry Frohman, D. B. Meacham, Henry Gosiger, Colonel R. C. McKinney and Thomas P. Gaddis. Reception—H. M. Lane, Lazard Kahn, Thomas Griffith, W. T. White, William Gilbert, W. J. Isaacson, D. T. Johnson, Edwin McFarland, John Fritsch, Charles Erhart, S. P. Jones, T. J. Joyce, Frank Klaine, William Resor, Geo. Webb, J. A. Overhelman and W. C. Herron.

CONSIDERABLE export pig iron has been shipped from Warrant yards in Alabama recently.

VALVELESS PNEUMATIC HAMMERS.

Pneumatic tools are no longer a novelty in an up-to date shop; and as uses have increased for these ingenious machines, improvements have been made that remedy some of the faults found in the first types. Complicated construction,

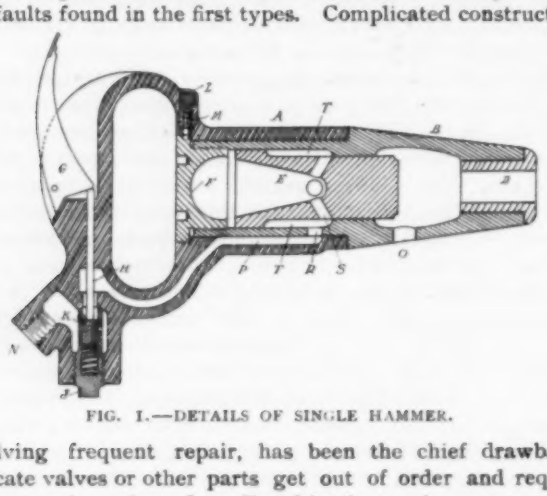


FIG. 1.—DETAILS OF SINGLE HAMMER.

involving frequent repair, has been the chief drawback. Delicate valves or other parts get out of order and require expert repair work, and small and intricate air passages become stopped up, resulting in annoying suspension and in repair shop work. The Ridgely & Johnson Tool Co., of Springfield, Ill., has perfected and now has in general use a line of pneumatic hammers, ranging from the lightest, for chipping and calking, up to hammers powerful enough to drive 1¼-inch rivets or do work usually done by hand with an 8-pound or a 10-pound sledge.

Simple construction has been the prime aim of the manufacturers. In their hammers this is secured mainly by having but one moving piece, the striking piston, which is its own valve. All the air passages are large, straight and direct and are always free and clean. In the single hammer, of which details are shown in Fig. 1, there are but four parts: The striking piston,—the hardened tool steel case or cylinder in which it acts, the bronze handle, the nut or cap to hold the handle on the case, and the throttle. The air is admitted by a broad passage between the case and the handle, through a large air port into the pressure chamber. This maintains a constant pressure under the shoulder of the piston and tends to drive it backward. When, however, the ports in the piston, which are also large, come into communication with the pressure chamber, the pressure fills the hollow portion of the piston and the cylinder in its rear. This forces the piston forward to strike its blow. Just as the blow is struck, the piston ports come into communication with the exhaust, when the pressure under the piston shoulder again returns the piston and the blows are thus repeated in rapid succession. These rapid blows reduce the jar or recoil to a minimum and enable the tool to carry a chip very rapidly, up to its capacity in size.

To overcome the objection raised to pneumatic tools by reason of the shock and vibration which the operator sustains, the manufacturers of the Johnson & Parfitt hammer have produced a hammer on the counter-balanced principle. In this machine a second piston is added, the two always working in opposite directions. Thus the vibration is absorbed and the operator sustains no jar or strain. The machine can be held with one hand while engaged on the heaviest work. Fig. 2 shows the counter-balanced hammer and Fig. 3 gives details of its construction. Both the single and the counter-balanced hammers are made in six sizes. Size C, which is recommended for general boiler-maker's work, will drive up to one-half inch rivets hot and do the work regularly and economically. It is claimed that the cost of riveting can be more than cut in two by using this machine. One man can hold it, while driving the heaviest bolts, and the use of the pneumatic "hold-on," as shown in Fig. 4, makes a single operator very effective.

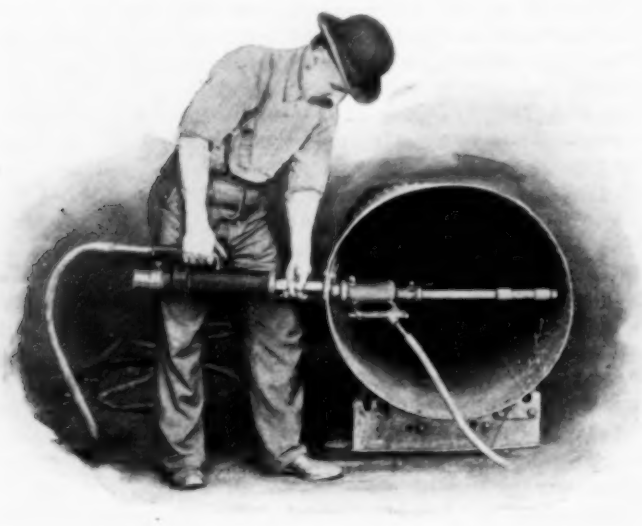


FIG. 4.—DUPLEX RIVETER AND PNEUMATIC HOLD-ON.

FIG. 5.—NO. 2 YOKE RIVETER, 16-INCH YOKE.

For shipyards, structural works, bridge works and car shops, the yoke riveter, shown in Fig. 5, is successfully employed. It is much lighter than the pressure machine of equal capacity and can be operated with fewer men. One man of ordinary skill and a rivet heater are all the force needed. A large single hammer is employed and a pneumatic hold-on, securely attached to opposite ends of a steel yoke. These yokes are detachable and special ones can be fitted to the machine. Fig. 6 shows the No. 2 yoke riveter as operated with balanced lever support.

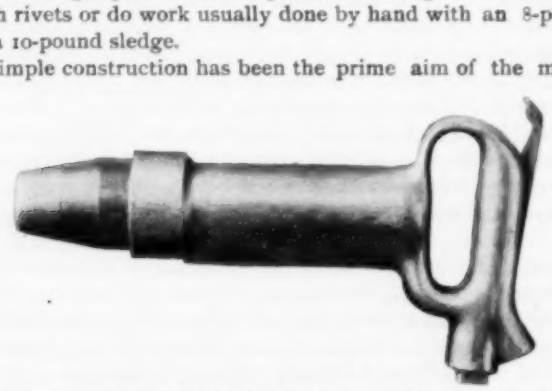


FIG. 2.—COUNTER-BALANCED HEAVY CHIPPING AND LIGHT RIVETING HAMMER.

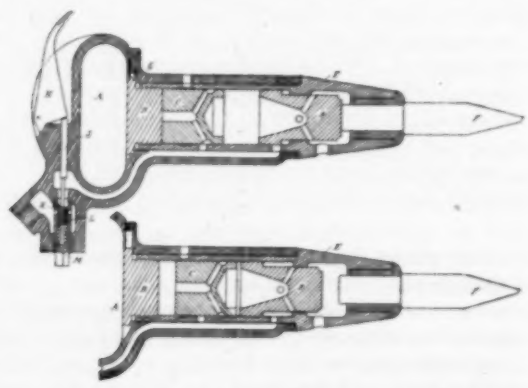


FIG. 3.—DETAILS OF COUNTER-BALANCED HAMMER.

PRODUCTION OF COAL IN 1897.

From a preliminary statement compiled by E. W. Parker, statistician of the United States Geological Survey, it is shown that the total output of coal in the United States amounted approximately to 198,250,000 short tons, with an aggregate value of $198,100,000, a fraction less than $1 per ton. Compared with 1896 this shows an increase in tonnage of 6,270,000 tons or about 3.3 per cent. The increase in the value of the product was only $1,700,000, a little less than 0.9 per cent. The amount of coal produced in 1897 was the largest on record. The average value per ton was the lowest ever known, continuing the declining tendency which has been shown without any reaction for the past six years. The increase in production and the decline in value was confined to the output of bituminous coal. The anthracite production in Pennsylvania decreased nearly two and a quarter million tons from 54,346,081 short tons (equivalent to 48,523,287 long tons) to 52,122,408 short tons (or 46,537,864 long tons) in 1897, while the average price received at the mines per short ton was $1.65 per short ton ($1.85 per long ton) in both years. This is not an increase, but much better than a loss, one cent per ton meaning a total of more than $500,000. In obtaining this average price for anthracite coal per ton, only marketable sizes are considered, and the item of "colliery consumption" usually consisting of culm, or waste, and an otherwise valueless product is not included. Excluding this factor, the marketable product of anthracite coal in Pennsylvania during 1897 was 42,637,864 long tons (equivalent to 47,544,408 short tons), against 44,188,460 long tons (49,491,075 short tons) in 1896.

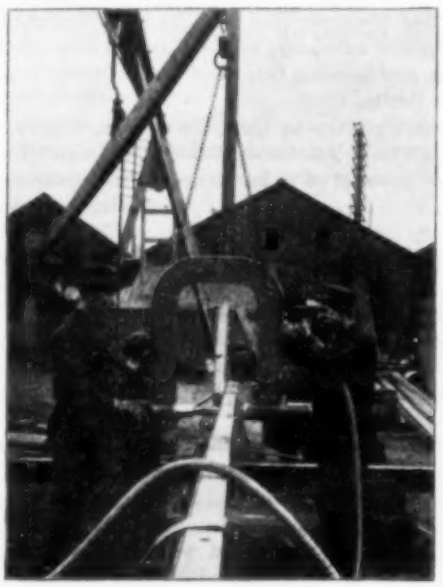


FIG. 6.—YOKE RIVETER, BALANCED LEVER SUPPORT.

The fact that the bituminous production should have shown an increase of 8,500,000 tons in spite of the prolonged strike in the competitive fields of Pennsylvania, Ohio, West Virginia, Indiana, and Illinois (four of them being the largest coal producting States, aggregating nearly 100,000,000 tons, or more than two-thirds of the entire output), may be taken as an evidence of the wonderful capacity of our developed bituminous mines. Of the 29 bituminous coal producing States there were only six in which the production in 1897 was less than in the preceding year. These six were Georgia, Indian Territory, Kansas, Nebraska, Ohio, and Oregon. In 15 of them the output was the largest ever obtained. Of the five competitive States previously mentioned, only one—Ohio—had a decreased production in 1897. In 20 out of the 29 States producing bituminous coal the average price per ton in 1897 was less than it was in 1896, the general average for the United States being 83 cents in 1896 and 81.6 in 1897. The decline of 1.4 cents on a total product in 1897 of 146,000,000 tons represents a decrease of something over $2,000,000 from what would have been the value if the price had been the same as it was in 1896.

Considering the industry by States, Pennsylvania holds her usual position. The combined product of anthracite and bituminous coals from the Keystone State amounted to 106,000,000 short tons, nearly 54 per cent of the total output. Pennsylvania's percentage of the total bituminous output was 37, her output of soft coal being 54,000,000 tons. Illinois remains in second place with a total of a little over 20,000,000 short tons. West Virginia comes third, having increased her output nearly 700,000 tons over 1896, and leading Ohio, which comes fourth by nearly 1,250,000 tons. Alabama reached her maximum output of 5,893,770 tons and stands fifth. Iowa sixth, lacked only 85,000 tons of reaching 5,000,000 tons. Maryland produced 4,442,000 tons and Indiana a little over 4,000,000 tons.

PRODUCTION OF COAL IN UNITED STATES IN 1897.

State.	Production.	Value.	Avr'ge price pr. ton.
Alabama	5,893,770	$ 5,192,085	$ 0.88
Arkansas	807,207	893,672	1.11
California	89,092	200,866	2.25
Colorado	3,303,449	3,772,520	1.14
Georgia	195,869	140,466	.717
Illinois	20,072,758	14,472,529	.72
Indiana	4,019,360	3,416,586	.85
Indian Territory	1,321,840	1,800,924	1.36
Iowa	4,915,463	5,566,332	1.14
Kansas	2,694,242	3,230,666	1.20
Kentucky	3,906,458	3,170,811	.81
Maryland	4,442,128	3,397,785	.76
Michigan	221,792	322,266	1.45
Missouri	2,627,458	2,878,204	1.09
Montana	1,647,999	2,897,642	1.75
Nebraska	495	1,800	3.64
New Mexico	671,879	954,406	1.42
North Carolina	21,280	27,000	1.27
North Dakota	70,175	70,358	1.
Ohio	12,219,193	9,508,870	.78
Oregon	100,311	311,550	3.11
Pennsylvania bituminous	53,842,800	37,964,496	.70
Tennessee	2,880,994	2,316,239	.80
Texas	619,602	950,713	1 53
Utah	549,646	651,555	1.19
Virginia	1,524,956	1,022,823	.67
Washington	1,434,112	2,777,687	1.94
West Virginia	13,556,978	8,637,617	.64
Wyoming	2,483,074	2,676,191	1.08
Total	146,134,380	$ 119,214,659	$ .816
Pennsylvania anthracite	52,122,408	$ 78,880,048	a$ 1.65
Grand Total	198,256,788	$ 198,094,707	

a Excluding "colliery consumption."

The foregoing statement and table are based upon actual returns from mines representing 95 per cent of the total product. In cases where returns have not been received careful estimates calculated upon the production in previous years have been made, so that revision of these figures by later returns will not materially affect the totals.

Removal to Pittsburg.

The removal of the plant of the Charles Munson Belting Co. from Chicago to Pittsburg is now about completed. Last summer the change was decided upon in order to secure a more central location and save freight on Eastern business. The Allegheny plant of J. Groetzinger & Co. was secured and the equipment of the Chicago plant has been gradually transferred until now the manufacturing of the company is all done in Pittsburg. The Chicago plant will be maintained for repair work and rush orders, as is done at each of the branch offices of the company. The main building at Pittsburg is a well lighted brick, four stories high, 300 by 80 feet, adjoining the tannery proper. Besides the machinery brought on from the Chicago plant, there has been much new machinery added, which both increases the output and employs the most modern methods of dressing and finishing belts. Three floors are given over to the making of belting exclusively. The fourth floor is used in making leather specialties of all sorts from the leather condemned as unfit for belting. The utmost care is used in the cutting of the hides and selection of the parts, and the leather not up to the standard for belting is set aside to be worked into cups, washers, various parts of shoes, etc. The method of stretching is noticeable because of the time allowed. About 250 stretching machines are in use and, instead of hurrying the process, the strips of leather are held in place until completely dried. The new location enables the Pittsburg office to save time in supplying Eastern business as well as reducing the freight handicap encountered in bringing material east from Chicago. The general offices remain in Chicago.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

At Dresden, O., 200 lots in a new "iron addition" have been sold and negotiations are now about to be closed for the new sheet mill which was promised on condition that so many lots be taken.

Wellsville, O., citizens have raised $17,000 bonus for a rolling mill project in which Niles, O., parties are interested. Three hot mills, three cold mills, doubling shears, annealing furnaces and six heating furnaces will be required.

The Burlee Dry Dock Co., New York, has been incorporated with $300,000 capital, by William J. Burlee, of Port Richmond, S. I.; William J. Davidson, of West New Brighton, S. I., and James T. O'Donnell, of Brooklyn, to carry on a general dry dock, foundry, shipbuilding and repairing business.

The stockholders of the Belfont and Kelly mills, Ironton, O., and the Norton mill, Ashland, Ky., have voted to erect a rod mill in connection with their steel plant at Ashland, and they have already invited proposals for building and machinery. Work will begin as soon as these bids are in, and the enterprise will be pushed to completion. The main building will be of iron and brick and completely fire proof. It will be 400x100 feet. With the attached and inside buildings it will cover a large area. The mill will be equipped with engines of the latest designs and with rod mills of the Garrett pattern, which guarantees the most rapid production. The erection of this rod and wire mill means the addition of wire nail machines to all three factories, which in addition to the cut nail facilities, will enable the establishments to fill orders for either kind of nails.—[Ironton, O., Register.

Postmaster General Gary will open proposals May 5 for supplying, for the use of mail-equipment shops, wire, rivets, burrs, emery, steel, chemicals, etc.

At Live Oak, Fla., Geo. Robins and others intend to operate an iron and brass foundry.

O. L. Gard, Deshler Block, Columbus, O., is in the market for a 50 h. p. stationary engine and 60 h. p. boiler. Second-hand will do, if in first-class condition.

Vicksburg Ice Co., Vicksburg, Miss., wants an air compressor 10x12x14 inches.

The Ypsilanti Machine Works, Ypsilanti, Mich., are in the market for a second-hand planer, about 24x24 inches by 5 feet. It must be strong and heavy.

Sydnor Pump & Well Co., Richmond, Va., is in the market for small vertical steam engines and boilers ranging from two to 10 h. p.

The establishment of a shovel factory, at Johnstown, Pa., is assured. All the stock has been placed, and most of the machinery bought. Charles Glock, George Wild, Peter Weitz, John Horn, and George Marsden form the company.

Chas. Dean, Thos O. Henry, and others of Ironton, O., are organizing a company which will put a foundry and machine shop in that place. The promoters of the new industry, while they have as yet selected no location, are securing figures on the cost of necessary buildings.

The Iroquois Iron Works, of Buffalo, N. Y., have been incorporated, with capital of $100,000. Directors are S. M. Clement, S. T. Viele, R. R. Hefford, Wm. Y. Warren and W. Grant King, of Buffalo.

The Silver Bros. Iron Works Co., Salt Lake City, Utah, has been incorporated with a capital stock of $90,000. John A. Silver is president; Hyrum A. Silver, vice-president; and Joseph A. Silver, secretary, treasurer and manager.

Missouri Wire & Nail Co., East St. Louis, has been incorporated with capital stock of $10,000, by R. M. Scruggs, C. F. Hintze and A. N. Sager.

The Lancaster Sheet Metal Co., has been chartered to manufacture tin plate and other metal sheet at Lancaster, Pa. The capital is $25,000; directors, H. L. Raub, A. K. Raub, and R. M. Reilly, of Lancaster.

A charter has been issued at Harrisburg to the Duquesne Galvanizing Co.; capital, $20,000.

The Whitestone Forge & Construction Co., of New York, has been incorporated, to manufacture machines, engines, and motors and build and repair ships. Capital, $60,000. Directors, Samuel B. Sexton, of Hyde Park; L. M. Scott, of 11 Broadway; J. C. Henderson and J. C. Scott, of New York; and F. W. Breuil, of Whitestone, Queens county.

New Construction:—

The Shiffler Bridge Co., of Pittsburg, has contracts for the erection of a steel frame blast furnace engine house and beam yard power house for the Cambria Iron Co., at Johnstown, Pa.; eight iron and steel buildings for the new plant of the McKenna Steel Working Co., at Kansas City, Kan.; an extension to the sheet mill building of the Apollo Iron and Steel Co., at Vandergrift, 140 x 160 feet; a large addition to the bar mill building of the Shenango Valley Steel Co. at New Castle, Pa., 165 x 170 feet, and four large buildings for the new plant of the Epping-Carpenter Co., of Pittsburg, consisting of brass foundry, 50 x 100 feet; blacksmith shop, 50 x 100 feet; fitting shop, 50 x 50 feet, and machine shop, 100 x 200 feet.

T. G. Brown, of Warren, O., will build a new machine shop.

The Portage Iron Co., of Duncansville, Pa., is rapidly pushing work on its new nail plant. The rod mill, with four trains of rolls, is also nearing completion. All the buildings are up, and the boilers and machinery are being installed. It is expected to have everything in operation by May 1.

The American Sugar Refining Co., of Brooklyn, N. Y., is placing a new fireproof roof over its No. 1 boiler house. It will be fireproof, consisting of steel trusses covered with corrugated iron, and is being furnished by the Berlin Iron Bridge Co., of East Berlin, Conn.

Plans are being made by C. A. Reed, architect, for railroad shops for the Chicago & Great Western Ry., at Oelwein, Ia. The plant will consist of 10 buildings. The machine shop is to be 95x700 feet, two stories. Hoff Bros., Minneapolis, Minn., are the contractors.

The Cosmopolitan Construction Co., incorporated at Springfield, Ill., with $500,000 capital, will build a power house at Chicago for the Cosmopolitan Electric Co. A site 150x200 feet has been bought. The plant will be thoroughly modern.

The Minneapolis Beet Sugar Co. has awarded the contract for the machinery for its new plant at St. Louis Park to the Kilby Mfg. Co., of Cleveland.

Bids will be opened April 20 by C. W. Felt, chief engineer of the G., C. & S. F. Ry., Galveston Tex., for the erection of machine, car, paint, boiler, blacksmith, tin and brass shops, pattern and store houses, with purchasing agent and superintendent of machinery offices, and boiler-house with stack, to be constructed of stone, brick and iron, at Cleburne, Tex.

On the site of the old rail mill of the Colorado Fuel & Iron Co., Pueblo, Col., a new structural mill has been erected. New equipment is now being installed.

At Canton, Ill., work has begun on the new malleable iron plant for the Parlin & Orendorff Co.

At Syracuse, N. Y., the Central City Brass Mfg. Co. has purchased a site and will erect two buildings, one 50x60 and the other 60x80 feet.

Foundation work is in progress on the site of the new tin mills of the Laughlin Nail Co., at Martin's Ferry, O.

Moore, James & Co., Broadway, between Dock and Branch, St. Louis, will build a foundry.

Additions, Enlargements, Removals, Etc.:—

It is reported that the Nolte Brass Co., Springfield, O., will erect a two-story brick building, and that a 40-h. p. gas engine will be installed.

At Hagerstown, Md., the Crawford Bicycle Works is erecting an addition to its plant.

Ground has been broken at West Newton, Pa., for the erection of additional buildings by the United States Radiator Co. The new buildings to be erected will be a large brick addition to the foundry, and a frame structure, 60x120 feet, for cleaning and testing purposes.

The Seneca Boiler & Machine Co.'s plant, at Fostoria, O., is being removed to East Toledo, O., to a location near Craig's shipyard.

The Chester Steel Castings Co., Chester, Pa., is putting in a new 20-ton open-hearth steel furnace and building an addition of about 75 feet to its open-hearth foundry.

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The Cochrane Heaters and Purifiers and the Cochrane Live and Exhaust Steam Separators are noted in America and other countries for their practical, common sense design, substantial construction, reliability of action and general suitability for the purposes used. They have been approved and adopted by many very well-known consulting, advisory and acting engineers, and by hundreds of the big steam users. We take pleasure in answering inquiries, and to those interested, who will send particulars, we will also be pleased to forward printed matter, specifications, estimates, etc.

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At Philadelphia, the contract has been let for a machine shop addition to the plant of Smith & Drum, at Huntington and Coral sts. It will be one-story, of brick and iron, 40x150 feet.

The Iowa Iron Works, Dubuque, Ia., has secured a city grant of land on which to extend its machine shops, in view of the building of three new steel boats the coming summer.

Fires and Accidents:—

A fly-wheel burst in the Greenridge Iron Works, Scranton, Pa., on March 29, killing one man and injuring two others. The wheel weighed 14 tons, and was running at about 450 revolutions per minute.

The Malleable Iron Works, of Marion, Ind., partly burned on March 26. The loss is estimated at $5,000, covered by insurance.

The Harmany Foundry, at Joplin, Mo., was destroyed by fire on March 29. Loss, $10,000; insurace, $5,000.

The plant of the O. K. Stove & Range Co., Louisville, Ky., was destroyed by fire. Loss, $80,000; insurance about $30,000.

At St. Louis, the brick building used by the Fritch Foundry & Machine Co., was badly damaged by fire April 4. Insurance, $12,500.

The Fisher Engine, Foundry & Machine Works, at 23d and Smallman sts., Pittsburg, were totally destroyed by fire, April 7; loss, $35,000, well covered by insurance. The plant was operated by Phillips & McLaren.

General Industrial Notes:—

The National Foundry & Pipe Works, of Scottdale, Pa., has secured a contract from Worcester, Mass., for 3,000 tons of pipe at $16.60 per ton.

Improvements to the armor plate department of the Bethlehem Iron Co. are to be made this spring.

At the stockholders' meeting of the Acme Steel Roofing & Supply Co., of Canton, O., the following officers were elected: Dr. A. C. Brant, president; Edward Raff, vice-president; John Lorenze, secretary, and directors, H. A. Kennedy, C. W. Butcher, A. C. Brant, Edward Raff, E. D. Brant. The capital stock was increased from $25,000 to $50,000.

The Finished Steel Co., of Youngstown, O., has received several orders from England, the product to be shipped at once. Many foreign inquiries have been received.

At the Joliet plant of the Illinois Steel Co., the new mixer in the converter is almost completed. This will increase the output of the converter several hundred tons a week. At the billet mill a new blooming engine is being put in.

W. E. Kelley, receiver of the Fulton Steam Boiler Works, of Richmond, Ind., reports that the assets of the company are $10,000 in excess of the liabilities. It is now thought that a new company will be formed.

Bids will be opened April 27 for the construction of a system of water works at Pittsford, N. Y. There will be required about 281 tons of cast iron pipe, five tons of special castings, 43 fire hydrants, 22 valves and boxes, triplex power pump, gasoline engine, pump pit, pumping station, reservoir, etc. Paul Voorhees is engineer, Buffalo, N. Y.

The American Tool Works Co. is the name by which the Davis & Egan Machine Tool Co. will be known hereafter. The change of name goes with a reorganization of the concern, now in progress, which includes an increase of the capital stock from $500,000 to $1,000,000. The steadily increasing foreign business of the company has necessitated enlargement, and the change of name is made in the interest of this same foreign business. The new charter is secured in West Virginia. The capital invested in the Davis & Egan Co. will form the common stock of the American Tool Works Co., and will remain in the same hands. Of the $500,000 new stock to be issued, all will be preferred. Of this amount only $200,000 will be put out at this time, the remainder being held in the treasury. The $200,000 has already been taken in full by private subscription. This preferred stock

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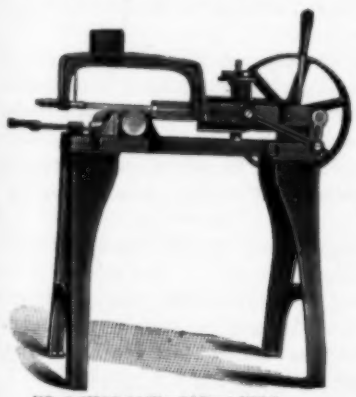

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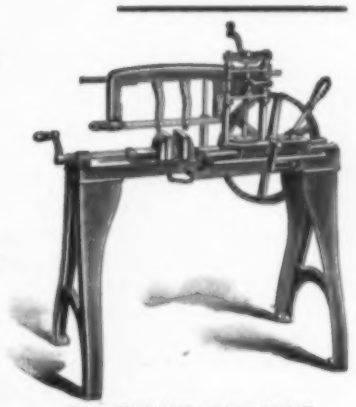

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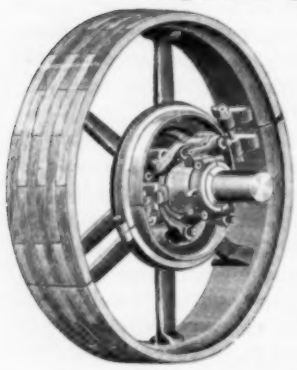

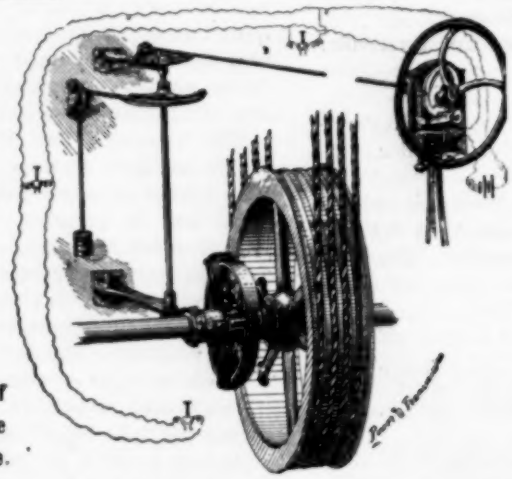

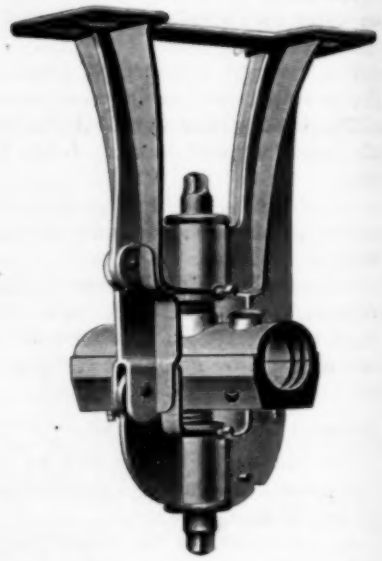

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GENERAL AGENTS FOR THE DODGE INDEPENDENCE WOOD SPLIT PULLEYS.

will have a fixed and cumulative dividend of six per cent, but will be non-voting. The stock of the Davis & Egan Co. has paid 12 per cent annually since the company was formed from the old Lodge-Davis concern. The last act of the Davis & Egan directors was the declaration of the regular quarterly dividend of three per cent. It is assured that Mr. Charles Davis will be president of the American Tool Works Co. The same line of manufacture of tools for use in the manufacture of machines and all metal work will be followed.

The Brown Hoisting & Conveying Machine Co., Cleveland, shipped from its plant one day recently a solid train of 17 cars of machinery to Philadelphia, at which port it was loaded on the steamer Cothele for Mariopol, Russia. This shipment represents three Brown patent bridge tramways for the handling of ore for a large steel works at Mariopol, these bridges being driven by electricity. On the same date a shipment was made via the New York & Mediterranean Steamship Co., New York, to Trieste, Austria, for the Krainische Industrie Gesellschaft.

The Westinghouse Electric & Mfg. Co. has just opened a new branch office at Austin, Tex. J. E. Johnson will have charge of the office and of the further extension of Westinghouse business in the Southwest. The large contracts which this company has been handling in Mexico and the Texas region have led to the establishment of this new center of electrical trade.

A new erecting shop is to be added to the Brooks Locomotive Works, at Dunkirk, N. Y.

At Anniston, Ala., the plant of the Anniston Pipe & Foundry Co. has been sold to the Southern Pipe Co., a new corporation. The portion of the plant burned last year is being rebuilt and there will be some extension.

Press dispatches note a judgment taken at Montpelier, Ind., against the steel casting company, for $10,858, in favor

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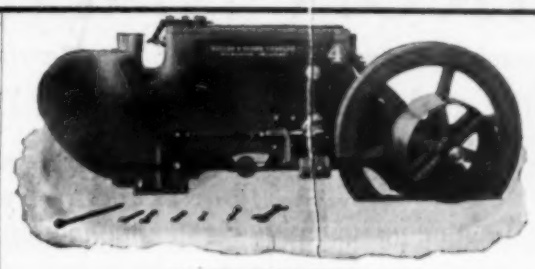

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A deal has been closed at Springfield, O., for the purchase of the Whiteley Malleable Iron Co.'s plant by the new Whiteley Mfg. Co., which will control the three shops recently purchased:—Amos Whiteley & Co., Wilson Whiteley & Co., and Whiteley Malleable Iron Co. These will be operated under three departments, with Wm. N. Whiteley as general manager. The three lines of products are agricultural implements, cellulose and bicycles.

The trustee of Chas. W. DePauw, assigned, has filed a petition for the sale of the latter's one-fourth interest in the New Albany, Ind., rail mill.

The Playford Stoker Co., of Cleveland, which has been making good progress with its improved chain grate and ash conveyor, has taken a contract to equip three boilers of 150 h. p. each at the plant of the Baker Chain & Wagon Iron Mfg. Co., Allegheny, Pa., with the Playford stoker.

The name of the Homestead (Pa.) Mfg. Co., is to be changed to the Homestead Valve Mfg. Co. and the company incorporated. A charter has been applied for by F. Schuchman, E. Eades Andrews, Wm. Heston, John Munhall, and Wm. Tunstall, and the capital stock at present will be $50,000.

The Borough council of Homestead, Pa., voted last week to refer the matter of vacating certain streets and alleys for the new universal plate mill of the Carnegie Steel Co. to a vote of the poeple on April 30. At a former meeting it was decided to fix a price on the street property but the action was rescinded and the election ordered instead.

The Edward P. Allis Co., Milwaukee, Wis., is reported to have the contract for six 6,000-h. p. Reynolds-Corliss vertical engines for the Metropolitan Traction Co., New York, to cost $500,000, and to be completed within the year. The company is also reported to have a contract for one 1,100-h. p. engine of a similar type for Ludwig Loewe & Co., Berlin, Germany.

The Whiting Foundry Equipment Co., Harvey, Ill., are furnishing a set of pneumatic cranes to be used in the shipyards of Yarrow & Co., London, Eng. It has also built a plant at Punta Arenas, Chili; also the equipment for the new shop of the Boston & Maine Railroad, at Camden, Mass., consisting of two giant electric cranes, two gas engines and several electric motors.

The Rock Island (Ill.) Plow Co. has raised its molders' wages 10 per cent, or to $2.75 a day.

In the suit brought against the Walker Co., of Cleveland, for alleged infringement of the VanDepole patents, by a trolley it has been manufacturing, the Court of Appeals of New York decided against the General Electric Co., owner of the VanDepole patents. The General Electric Co. claimed that the patents in question gave it the exclusive right to manufacture street car trolleys, since they cover broadly all devices for taking the current from an overhead wire.

The Riverside Mfg. Co., of Connellsville, Pa., has begun suit for $25,000 against the R. G. Dun & Co. The plaintiff's business is smelting and manufacturing copper and brass ingots, and dealing in junk of all kinds. The plaintiff's statement sets forth that on Sept. 4, 1897, the defendants printed on their mercantile sheets that the plaintiff's firm had assigned. By reason of this publication the plaintiffs allege that their business credit and standing were injured, and that they lost trade so heavily that they were compelled to confess judgment, and were finally sold out by the sheriff.

Stephen Noble, of Anniston, Ala., and associates have leased the Home Iron Co.'s furnace, at Bristol, Tenn., and will put it in blast.

The Michigan-Peninsular Car Co., Detroit, will start up its pipe foundry.

The Indianapolis (Ind.) Foundry Co. now has the largest number of orders on its books in the history of the works. With the completion of a new addition the capacity of the plant will be considerably increased.

The Jupiter Iron Works, Carondolet, Ill., are being put in shape to resume operations.

At the converting department of the Edgar Thomson Steel Works, April 7, all records were broken by the employes turning out 96 heats in 12 hours. In the blooming mill 100

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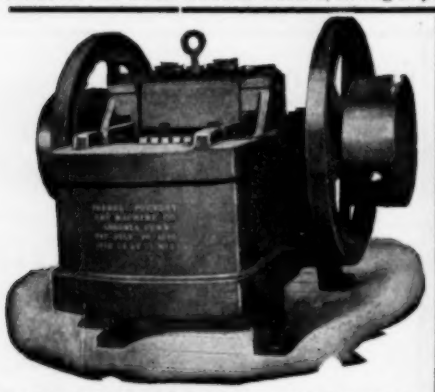

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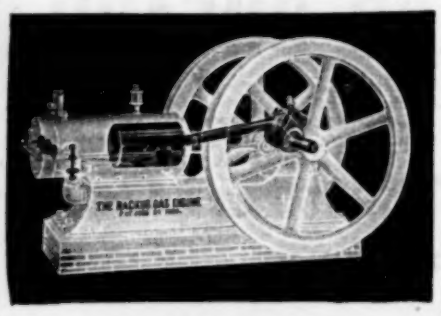

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Columbus Machine Co.,

COLUMBUS, O.

large hydraulic crane and overhead traveler for the South Works of the Illinois Steel Co. Among other recent orders are two large cupolas for the new foundry of the Niles Tool Works Co., Hamilton, O.; two of about the same size for Hooven, Owen & Rentschler, of Hamilton, and two more large ones for the Edward P. Allis Co., Milwaukee, Wis. The Whiting Co. is putting a 20-ton three-motor electric traveling crane in its shop at Harvey.

At Allentown, Pa., April 8, the sheriff sold the Macungie Iron Co. furnace, six houses and 56 acres, to Emma Audenreid, of Philadelphia, for $10,000. The property is mortgaged for $17,000.

The Sheridan Furnace, at Sheridan, Pa., will go into blast about May 15.

At Erie, Pa., the boiler makers in all shops went on a strike April 9. They presented a new scale to the proprietors, who refused it. The shops affected are the Erie City, Union Iron Works, Stearn's, Nagles', Pennsylvania Boiler Works and Bay State Iron Works.

The Norton Emery Wheel Co., of Worcester, Mass., have been running 13 hours since Dec. 1, and with a larger force than ever employed before. The firm has recently received an order for 17,000 corundum wheels from one company. A large 18-foot kiln is just being completed to increase its capacity. Other improvements and additions are in comtemplation, and a new central power plant with new engines, boilers, dynamos, etc., has just started up.

The Westinghouse Electric & Mfg. Co., Pittsburg, Pa., is reported to have the contract for the entire equipment of machinery and electrical apparatus for an electric lighting heats were recorded.

Messrs. A. Symms and Walton will establish a plant at Lansing, Ia., for the manufacture of a rotary pump.

THE Philadelphia exposition of 1899, according to a preliminary prospectus just issued, will be held from May to October, 1899, and outlines the plan as follows: 1. To show foreign buyers the goods American manufacturers offer to export, and to establish their superiority. 2. To show American manufacturers the character of goods they must compete with in the open markets of the world. 3. To show how American goods should be packed, labeled and put up for export trade. 4. To bring the manufacturers and merchants of the United States in direct personal contact with the principal buyers, merchants and bankers of foreign countries. There will be three divisions of the Exposition, the most important being the exhibit of American manufactures. In the second division will be shown samples of successful foreign export articles, while the third department will illustrate methods of packing. Wm. Harper is the director general.

APPLICATION has been made to the Mexican government for a concession to establish a wire cable factory, the first of its kind in the Republic.

A LEADING official of the General Electric Co. is quoted: "It is true that we have received some contracts from the Government for special work, but the amount of money involved does not begin to compensate us for the loss of contracts which we undoubtedly would have received if there were no disturbance to general business from the Cuba trouble. Where we get one contract from the Government I may say we lose ten from syndicates which were contemplating new work of various kinds."

THE tin house of the La Belle Steel Co. at Wheeling was destroyed by fire last week.